

ART. XLVII. — *A Commentary on Suter's "Manual of the New Zealand Mollusca."*

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Communicated by W. R. B. Oliver.

[Read before the Auckland Institute, 16th December, 1914.]

THE receipt of the long-looked-for "Manual of the New Zealand *Mollusca*" has given me great pleasure, and I hasten to emphasize my appreciation of Mr. Suter's work, and tender my congratulations to him upon the successful completion of his task and upon the magnificent memorial he has created to his name. I have elsewhere, in another connection, observed the ease of destructive criticism as contrasted with constructive work, and I once more appear in the unhappy rôle of a critic who could not have compiled such a work as that subjected to analysis. The part is not a pleasant one, as I well know the disadvantages under which Mr. Suter has perpetually worked in the preparation of his splendid guide, for I once worked at the study of the New Zealand *Mollusca* with no other aid than the Manual compiled by Hutton in 1880. Since then I have enjoyed the benefit of continual access to the unrivalled collections and literature at the British Museum (Natural History), South Kensington, with also daily intercourse with all the well-known British malacologists. Such a contrast has enabled me to realize probably more fully than any other malacologist the wonderful work Mr. Suter has completed.

I have felt compelled to make the preceding remarks, as the following long list of alterations and corrections of Mr. Suter's results might otherwise be misunderstood.

In the present paper the notes are such as I have jotted down while engaged upon the determination of the collection made at the Kermadec Islands during 1908, and also comparison with collections made at Lord Howe Island and Norfolk Island by Mr. Roy Bell.

At the present time I can only indulge in the study of museum collections as regards Neozelanic shells, but the past days of collecting throw many a gleam of light upon the darkness of museum comparisons and dull book-handling.

The majority of the succeeding notes are due to the latter causes, but some field notes also occur. I anticipate, with such an easy guide as that offered by Mr. Suter, a great revival of interest in the field in New Zealand, as there is so much to do. I do know, in my own case, had such a manual been available my own efforts would have been more vigorous and fruitful.

Mr. Suter has omitted the Kermadec *Mollusca*, writing that the Kermadec Islands "belong to a distinct province of the Australian subregion." I am very gratified at this conclusion, which is quite justified, and in agreement with my own results. I hope an account from the pen of my companion, Mr. W. R. B. Oliver, dealing with the Kermadec *Mollusca* as a whole, will succeed this article. Study of it in connection with the Manual will fully confirm Mr. Suter's statement.

Unfortunately, there is one blemish in the Manual, and that is the rejection of names unaccompanied by a figure in favour of later different names proposed with the shell figured. To the systematic worker this is a serious matter, as the International Rules are quite clear upon this point,

and I know of no other recent worker who has followed this practice. In some cases Mr. Suter has given a note remarking his action, but in a few cases he has omitted to do so. In every case, of course, Mr. Suter's action is contrary to the International Rules, and the earliest name must be reinstated.

The succeeding notes are to a great extent nomenclatural, and I want here to emphasize the invaluable aid that the "Index Animalium," by C. Davies Sherborn, must be to the Neozelanic student. Many of the errors here corrected would have been just as easily amended by systematic workers in New Zealand had reference been continually made to Sherborn's priceless work. By means of it they can be practically assured of names prior to 1800.

I am placed in a peculiarly favourable position, as, in addition to the published work, I have access to Mr. Sherborn's continuous labour, and also obtain his unique advice upon bibliographic work. No words can express the gratitude I feel, and it must be understood that many of the following notes are due to Mr. Sherborn's initiative, and depend entirely upon his work, freely given at every opportunity.

I also desire to record the invaluable assistance Mr. E. A. Smith, I.S.O., of the British Museum, has given me. Many of the notes here given are based on his unequalled knowledge of molluscan forms and literature. In every case of doubt I have consulted Mr. Smith, and in no case have I written anything save the results of our considered judgment.

The majority of my notes are novel, but in order that my commentary should cover the recent work done I have included items published by Hedley, Smith, and myself which have appeared since or are not incorporated in the Manual. I give here only those notes which I consider complete at the time of writing—viz., the 15th September, 1914. I mention this as it is certain that some of them will be out of date before publication in June, 1915.

Suter has remarked on p. 941, "I think it is more in the interests of science to separate a number of more or less distinct forms which are produced by differences in their environments. Too much lumping does not tend to advance scientific knowledge." I emphatically endorse this statement, and would apply the principle to the usage of restricted genera and subgenera. I would draw attention to the extraordinary action of British malacologists who, when dealing with Antipodean material, have lumped, as regards genera, in the most casual manner. Yet when classifying the British molluscan fauna, both land and marine, the same workers have utilized to the extreme limit restricted genera and subgenera.

I herewith propose many new groups, which are all the result of study of the Neozelanic forms in conjunction with extra-limital species, and I believe the usage of these groups will tend to advance our knowledge.

I have been compelled to make continual reference to my papers in the Proceedings of the Malacological Society of London, where the technical details of the matters are fully discussed. As the Proceedings of this society may not be commonly available throughout New Zealand, I will gladly forward copies of my papers to any reader interested in Neozelanic malacology. Any requests addressed care of British Museum (Natural History), South Kensington, London, S.W., would always reach me.

Some of the succeeding notes may appear rather lengthy, but I have incorporated many extracts explanatory of my conclusions, as I know such cannot be easily referred to, and they will aid the New Zealand worker

in understanding better the results stated. The references given can be quoted freely, as I have carefully verified each one myself.

Order Polyphacophora.

This order has been my chief interest ever since I commenced the study of molluscs. I hope to incorporate all the results of my investigations in a monograph of the Australasian forms. I have, to this end, contributed to the Proceedings of the Malacological Society (London) a series of articles dealing with nomenclatural problems, and also indicating alterations necessary in classification. I herewith give a summary as affecting the names and status of the New Zealand genera and species as I understand them at present. In the "Additions and Emendations," pp. 1077-82, Suter has included some of my earlier notes, so that when considering this group these must be reckoned with. On p. 1082 Suter has given a synopsis of Thiele's classification of these molluscs, a scheme which I generally approve of. I would, nevertheless, indicate that Thiele's arrangement opens up a large field for study, as, though radular characters form the basis of his grouping, shell features confirm it.

Ischnochiton contractus (Reeve, 1847). [P. 8.]*

I have not seen Suter's immature specimen, but I doubt if it should be referred to this species. Mr. W. L. May has sent me specimens of three distinct species which have been confused by Tasmanian collectors under that species-name.

Ischnochiton campbelli (Filhol, 1880). [P. 9.]

On p. 1077 Suter comments upon my identification of *I. fulvus* Suter, 1905, and *I. parkeri* Suter, 1897, with the earlier *Tonicia gryei*, Filhol, 1880, and rejects the last-named, as Filhol's description was unaccompanied by a figure; but Mr. Suter's rejection cannot be maintained. He also differs from me in still considering his own two names as representing distinct species. I have therefore once more re-examined the shells, of which I have long series, and cannot see any differentiating features. Suter only gives "shape and divergence," and in this genus these characters are unstable. Further study of these shells has convinced me that the correct name to be used is as above, based on *Lepidopleurus campbelli* Filhol (Comptes Rendus Sci. Paris, vol. xci, p. 1095, 1880; Campbell Island). When I studied the types of the French authors, by permission of the Curator of the Paris Museum, the types of this species had been mislaid. As the types of *Tonicia gryei* Filhol were hidden under the later name *Lepidopleurus melanterus* Rochebrune, I conclude that the tube so labelled also contained the shells described by Filhol as *L. campbelli*. The description is quite good—indeed, more applicable in detail than that of *Tonicia gryei*, which follows it. Though no figure was offered, this is no reason for dismissing Filhol's name, and I therefore reinstate it as above.

I have seen specimens from South Australia named *I. fulvus* by Dr. Torr, but these are at once recognized as distinct by examination of the girdle-scales. The few deep grooves on the scales of *I. campbelli* Filhol are quite characteristic.

* The references in square brackets—*e.g.*, [P. 8.]—give the page of the "Manual of the New Zealand Mollusca" referred to, but the names at the head of the paragraphs in this paper are not always those used by Mr. Suter.

Ischnochiton maorianus Iredale, 1914. [P. 9.]

In the Proc. Mal. Soc. (Lond.), vol. xi, p. 36, 1914, I proposed this name for the common New Zealand species known as *I. longicymba* Quoy and Gaimard, 1835.

In the Dict. Sci. Nat. (Levrault), vol. xxxvi, 1825, Blainville furnished the first systematic monograph of this order, and on p. 512 described *Chiton longicymba* from specimens collected at King Island, Bass Strait. In 1835, as quoted by Suter, Quoy and Gaimard figured a shell under Blainville's name, giving as localities New Zealand and Australia.

In the Manual Conch., vol. xiv, p. 87, 1892, Pilsbry detailed the differences between the shells thus named from Australia and New Zealand, and, ignoring Blainville's name, used Quoy and Gaimard's misinterpretation, further making confusion by restricting the name to the New Zealand form. It is unjustifiable to transfer names in this manner, and the only way out was to name the New Zealand species as I have done.

Acanthochiton australis (Suter, 1907). [P. 16.]

Suter described a *Mopalia australis* from the Snares Islands. Geographically the generic location was extraordinary, and it has now been proved that the genera of Chitons are restricted to certain geographical areas. Thiele, from this reasoning, threw doubt upon the accuracy of Suter's selection. I have been puzzled, but now put forward the solution. The description given by Suter agrees in every detail, save the number of slits in the anterior valve, with *Acanthochiton*. The normal number of slits in that genus is five, and any larger number is due to interslitting. Consequently the eight recorded by Suter is quite abnormal, and misled him owing to the eroded nature of the exterior. Had the sculpture been observed, it is almost certain that the true generic location would have been ascertained at first.

Plaxiphora aurata (Spalowsky, 1795). [P. 18.]

In the Proc. Mal. Soc. (Lond.), vol. xi, p. 31, 1914, I noted that *P. aucklandica* Suter was based upon a juvenile of *P. campbelli* Filhol. I now put forward the above as the correct name for a species which has the longest synonymy of any austral *Chiton*, and yet is the best-marked species.

In the Proc. Mal. Soc. (Lond.), vol. ix, 1910, I synonymized *P. superba* Pilsbry and *P. subatrata* (Pilsbry) Suter with the earlier *P. campbelli* Filhol. These names refer to Neozelanic shells. On the next page I pointed out that *P. carmichaelis* (Wood) should be used for the South American species commonly known as *P. setiger* King, and also recorded as a synonym *C. hahni* Rochebrune. The following year Pilsbry ("Nautilus," vol. xxv, p. 36, 1911) showed that *Chiton auratus* Spalowsky (Prodr. Syst. Hist. Test., p. 88, pl. 13, figs. 6a, 6b, 1795) antedated both, and though described from "Die Südsee (von der Insel Otahaiti?)" was undoubtedly the South American shell. I have examined large numbers of the latter in every stage of growth and preservation, and I cannot distinguish any differential characters between them and the Neozelanic shell. It should be remarked that hitherto no one has critically compared the two species. Pilsbry only knew the Neozelanic form from Carpenter's notes, and Suter never mentions the South American species in connection with it. A parallel distributional case is the admission of *Callochiton puniceus* Gould, a common South American shell, to the New Zealand *Chiton* fauna (p. 14). Suter

dismissed *P. campbelli* Filhol for lack of figure (p. 1079), but this excuse cannot be urged against Spalowsky's name, as a beautiful coloured representation accompanies it. I hope to elaborate the relationships of the littoral marine molluscs of South America and New Zealand at some later date, as hitherto not much notice has been given to this fact.

Plaxiphora zigzag (Hutton, 1872). [P. 19.]

Forty-odd years ago Hutton described this species, which has only received its due recognition this year (1914) by myself through indications by Thiele in 1909. In the Revision, p. 23, Thiele's examination of a small shell from Lyttelton led him to point out the differences between this and *P. caelata* Reeve. As the specimen seemed young, Thiele fortunately withheld nomination. When I was collecting at Lyttelton I was always puzzled at the association of all the small *Plaxiphora* under the one name, *caelata* Reeve. A smaller shell, differently coloured, with a peculiar girdle, was more common, but almost always in an unrecognizable state as regards valve sculpture. The larger, clean, easily determined *P. caelata* Reeve lived lower down, and was much more rare. I collected numbers of the former in the desire to secure good-looking specimens. Dissection of many of these showed them constantly to give the characters noted by Thiele as differentiating his unnamed form from *P. caelata* Reeve. In the Proc. Mal. Soc. (Lond.), vol. xi, p. 34, 1914, I recorded the fact that no new name was needed, as this was the species described by Hutton in 1872, and this must be added to the New Zealand list, and the name removed from the synonymy of *P. caelata* Reeve. Hutton's description is very good as regards external features, and the shell can be recognized by means of it.

Suter (p. 1078) remarks that *P. terminalis* may be classed as a subspecies of *P. caelata*; but that conclusion was not intended by my remarks. My reading of Thiele's description and figures of *P. schauinslandi* led me to decide that agreement with *P. terminalis* was certain, laying no weight upon locality. The Chatham Island species, which I have not seen, would appear to differ, though it is difficult to judge from descriptions, and, if so, would bear Thiele's name.

Plaxiphora glauca (Quoy and Gaimard, 1835). [P. 20.]

What the species included under this name is I do not know. It cannot bear this name, as it undoubtedly cannot be the Australian species thus named, for which the correct name is *P. albida* Blainville, as noted by Suter on p. 1079, but rejected as unfigured. "The latter [*glauca* Q. & G.] can still be retained," Suter writes; but that is not so, as the name is pre-occupied as corrected by Thiele.

Thiele also named *P. schauinslandi* from the Chathams, and this may be Suter's species. The coincidence of locality and description forces the conclusion, though *P. schauinslandi* is referable to the group I have called *Maorichiton*, while the true *P. albida* is a member of the *Poneroplax* group. I propose to substitute Thiele's name for the doubly invalid one selected by Suter, and ask for confirmation.

I have expressed my views with regard to the genus *Plaxiphora* in the Proc. Mal. Soc. (Lond.), vol. xi, pp. 31-33, 1914, and have separated the species *P. obtecta* Pilsbry, with generic rank. I have distinguished five subgenera in the genus *Plaxiphora*, and would insist upon their usage. This necessitates more careful examination of the species and study of

many dissected examples, but it obviates puzzles such as presented by the record of the species *P. glauca* Q. & G. from the Chatham Islands. The item in Suter's description, "Posterior valve convex, with transverse lines, mucro terminal," suggests its reference to the subgenus *Maorichiton*, and consequently its identity with Thiele's *P. schawinslandi*. The terminal mucro is characteristic of the subgenus, the micro in Australian shells being never terminal, but subterminal or subcentral.

Genus *Acanthochiton* (Gray, 1821, em.). [P. 25.]

The introduction of the subgeneric name *Acanthochitona* by Gray in the "London Medical Repository," vol. xv, p. 234, 1821, has been constantly overlooked, the later *Acanthochites* of Risso, 1826, being commonly in use. When I restored it (Proc. Mal. Soc. (Lond.), vol. xi, p. 126, 1914) I also gave notes on the names *Amicula*, *Cryptoconchus*, and *Macandellus*, and advocated the recognition of four generic types in the *Acanthochitons* of New Zealand. The synonymy of these names has been discussed in detail at the place quoted, so need not here be elaborated. The family name should be *Cryptoconchidae*, as I noted that *Cryptoconchus* must be regarded as introduced in 1815, and therefore antedates *Acanthochiton* Gray, 1821. I agree with Suter (p. 1080) that *Spongiochiton productus* Pilsbry should be dismissed from the New Zealand list.

Amaurochiton glaucus (Gray, 1828). [P. 34.]

In the "Spicilegium Zoologicum," pt. 1, p. 5, 1828, Gray described *Chiton glaucus* from unknown locality. Pilsbry rejected this name, as he considered the description inadequate, and stated that the type was lost. It appears he wrote this last sentence without inquiry, as the type is preserved in the British Museum. Further, Pilsbry based his monograph upon Carpenter's manuscript notes, and Carpenter recognized the type, and upon the back of the tablet is a note by Carpenter regarding his identification. It is undoubtedly the New Zealand shell, and all Neozelanic specimens for many years were, and are still, given Gray's specific name. I simply noted this fact in the Proc. Mal. Soc. (Lond.), vol. xi, p. 38, 1914, in a footnote, when noting the dissimilarity between "*Chiton pellisserpentis* Quoy and Gaimard" and "*Chiton quoyi* Deshayes" = *Amaurochiton glaucus* (Gray). The usage of the generic *Amaurochiton* becomes necessary through the rejection of "*Chiton*" as applicable to a heterogeneous assemblage of *Chitons* with scaly girdles and pectinated insertion teeth.

Amaurochiton was proposed by Thiele from an examination of the radular characters of *Chitons*. The name was given to the South American species *C. olivaceus* Deshayes. Thiele also proposed *Triboplar* generically for the present species, but these are only specifically distinct. Indeed, some workers have used the names as if they were conspecific. The relationship is really very close, and there can be no hesitation in using the above generic name. *Chiton* belongs to a species which superficially recalls *Chiton pellisserpentis* Q. & G., and the rejection of it in the present connection will be admitted as necessary by every accurate worker.

Craspedochiton cuneatus (Suter). [P. 42.]

The genus *Tonicia* must be dismissed from the Neozelanic fauna, and the species named by Suter *Tonicia cuneata* transferred to *Craspedochiton*. On p. 1081 Suter records Thiele's conclusion to the same effect from study

of the radula. My own result was achieved by criticism of the shell characters alone. The slitting in the head-valve is abnormal, four only being counted, instead of the usual five, but in *Tonicia* the normal is eight. I would emphasize the fact that the generic location must be regarded as temporary only, as I have not seen the unique specimen, and the figure given by Suter is comparatively valueless, showing seven valves only.

I wish Mr. J. C. Anderson would find some more specimens, but I well know the difficulty of securing these rare stragglers from deeper water.

Genus *Acanthopleura* (Guilding). [P. 44.]

This, with the species *A. granulata*, and all the matter connected with them, must be omitted, as this is no constituent of the New Zealand fauna. I have pointed out, as acknowledged in the Manual, p. 1078, that *Tonicia corticata* Hutton should rank as a synonym of *Platiphora biramosa* (Quoy and Gaimard). The genus *Acanthopleura* is confined to the tropics, rarely occurring outside these limits. It is absolutely littoral in every portion of its range, though sometimes specimens are dredged in shallow water. Two species occur in north Australia and the Pacific Ocean, but it is the West Indian species that is here included. It is impossible to accept such a record, and I do not think that the shell upon which Suter based his record had any history at all. It was certainly never collected alive in New Zealand waters. The locality, Pitt Island, I do not understand, and in view of the known distribution of Chitons this species cannot be recognized as Neozelanic. Will collectors please note.

Onithochiton neglectus (Rochebrune, 1881). [P. 49.]

In the Proc. Mal. Soc. (Lond.), vol. ix, p. 153, 1910, I wrote upon New Zealand Onithochitons, and agreed with Thiele that *O. semisculptus* Pilsbry was an absolute synonym of *O. undulatus* Quoy and Gaimard, and that, moreover, Pilsbry's name was antedated by Rochebrune's four specific names published a dozen years earlier. I also stated that I would consider Suter's var. *subantarcticus* as a different species. In the same journal, vol. xi, pp. 45-46, 1914, I noted that Quoy and Gaimard's name was pre-occupied, and that the common New Zealand shell would bear the name *O. filholi* Rochebrune. Upon reconfirming my data I find that this was due to a misreading of my notes, and that the name to be used is *O. neglectus* Rochebrune.

Suter's record of his var. *subantarcticus* from Cook Strait and New Brighton does not refer to this species, which is confined to the subantarctic islands, but belongs to a species quite distinct, but as yet unnamed.

Summaries are most helpful, and I here give a summary of my classification of the Neozelanic *Chiton* fauna, with the use of Thiele's system as basis. I add the original reference only when it differs or is not given by Suter.

Suborder LEPIDOPLEURINA.

Fam. LEPIDOPLEURIDAE Pilsbry.

Genus LEPIDOPLEURUS Risso, 1826.

Subgenus TERENOCHITON Iredale, 1914. *Terenoichiton* Iredale, Proc. Mal. Soc. (Lond.), vol. xi, p. 28, 1914. Type:

Lepidopleurus subtropicalis Iredale.

Lepidopleurus inquinatus (Reeve, 1847).

Suborder CHITONINA.

Fam. LEPIDochITONIDAE Iredale.

Genus CALLOCHITON Gray, 1847.

Subgenus ICOPLAX Thiele, 1893. *Icoplax* Thiele, Das Gebiss d. Schnecken, vol. ii, p. 392, 1893. Type: *Chiton puniceus* Gould.

Callochiton puniceus (Gould, 1846). Synonyms: *Chiton illuminatus* Reeve, 1847; *C. dimorphus* Rochebrune, 1889.

— *sulcatus* Suter, 1907.

— *empleurus* (Hutton, 1872).

— *platessa* (Gould, 1846). Synonyms: *Chiton crocinus* Reeve, 1847; *C. versicolor* Angas, 1852.

Genus EUODOCHITON Shuttleworth, 1853.

Eudoxochiton nobilis (Gray, 1843).

— *huttoni* Pilsbry, 1893.

Fam. PLAXIPHORIDAE Iredale.

Genus PLAXIPHORA Gray, 1847.

Subgenus PLAXIPHORA s. str.

Plaxiphora aurata (Spalowsky, 1795). *Chiton auratus* Spalowsky, Prodr. Syst. Hist. Test., p. 88, pl. 13, figs. 6a, 6b, 1795, "Tahiti" = Falkland Islands. Synonyms: *Chiton carnichaelis* Wood, Index Test. Supp., pl. 1, fig. 10, 1828, "Cape of Good Hope" = South America; *C. setiger* King, Zool. Journ., vol. v, p. 358, 1831, South America; *Plaxifora campbelli* Filhol, Comptes Rendus Sci. Paris, vol. xci, p. 1095, 1880, Campbell Island; *Choetopleura savatieri* Rochebrune, Bull. Soc. Philom. Paris, ser. 7, vol. v, p. 119, 1881, Straits of Magellan; *C. hahni*, id. ib., vol. viii, p. 34, 1884, Patagonia; *C. frigida*, id., Miss. Sci. Cap Horn, vol. vi, Moll., p. 137, 1889, Patagonia; *Plaxiphora superba* Pilsbry, Man. Conch., vol. xiv, p. 319, 1893, New Zealand; *P. subatrata* Suter, Proc. Mal. Soc., vol. ii, p. 188, 1897, New Zealand; *P. aucklandica*, id., Subant. Isds., N.Z., vol. i, Moll., p. 2, 1909, New Zealand.

Subgenus DIAPHOROPLEX Iredale, 1914. *Diaphoroplax* Iredale, Proc. Mal. Soc. (Lond.), vol. xi, p. 32, 1914. Type: *Chiton biramosus* Quoy and Gaimard.

Plaxiphora biramosus (Quoy and Gaimard, 1835). Synonym: *Tonicia corticata* Hutton, 1872.

Subgenus MAORICHITON Iredale, 1914. *Maorichiton* Iredale, Proc. Mal. Soc. (Lond.), vol. xi, p. 32, 1914. Type: *Chiton caelatus* Reeve.

Plaxiphora caelata (Reeve, 1847). Synonym: *Chiton terminalis* E. A. Smith, 1874.

— *zigzag* (Hutton, 1872).

— *murdochi* Suter, 1905.

— *schauinslandi* Thiele, 1909. Synonym: *Plaxiphora glauca* Suter, 1905 (not Quoy, 1835).

Subgenus FREMBLEYA H. Adams, 1866. *Frembleya* H. Adams, Proc. Zool. Soc. (Lond.), 1866, p. 445. Type: *F. egregia* H. Adams.

Plaxiphora egregia (H. Adams, 1866). Synonym: *Acanthochaetes ovatus* Hutton, 1872.

Suborder CHITONINA—continued.

Fam. PLAXIPHORIDAE—continued.

Genus GUILDINGIA Pilsbry, 1893.

Guildingia oblecta (Pilsbry, 1893). Synonym: *Plaxiphora suteri* Pilsbry, 1894.

Fam. CRYPTOCONCHIDAE Iredale.

Genus CRYPTOCONCHUS Burrow, 1815. *Cryptoconchus* Burrow, Elem. Conch., 1815, p. 190. Type: *Chiton porosus* Burrow. Synonym: *Amicula* Gray in Dieffenbach's "Travels in New Zealand," vol. ii, p. 246, 1843. Type: *C. porosus* Burrow.

Cryptoconchus porosus Burrow, 1815. Synonyms: *Cryptoplax depressus* Blainville, 1818; *Chiton leachi* Blainville, 1825; *C. monticularis* Quoy and Gaimard, 1835; *Cryptoconchus stewartianus* Rochebrune, 1881.

Genus ACANTHOCHITON (Gray, 1821, em.). *Acanthochitona* Gray, Lond. Med. Repos., vol. xv, p. 234, 1821. Type: *Chiton fascicularis* Linné. Synonym: *Phakellopleura* Guilding, 1829.

Acanthochiton zelandicus (Quoy and Gaimard, 1835). Synonym: *Acanthochaetes hookeri* Gray, 1843.

— *thileni* Thiele, 1909.

— *australis* Suter (1907).

Genus MACANDRELLUS Dall, 1878. *Macandrellus* Dall, Proc. U.S. Nat. Mus., vol. i, p. 299, 1878. Type: *Acanthochites costatus* Adams and Angas. Synonym: *Loboplax* Pilsbry, "Nautilus," vol. vii, p. 32, 1893. Type: *Chiton violaceus* Quoy and Gaimard.

Macandrellus violaceus Quoy and Gaimard, 1835. Synonym: *Chiton porphyreticus* Reeve, 1847.

Macandrellus mariae Webster, 1908. Synonym: *Loboplax stewartiana* Thiele, 1909.

Genus CRASPEDOCHITON Shuttleworth, 1853. *Craspedochiton* Shuttleworth, Mittheil. naturf. Gesell. Berne, p. 67, 1853. Type: *Chiton laqueatus* Sowerby. Synonyms: *Angasia* Pilsbry, Man. Conch., vol. xiv, p. 287 1893 (preocc.). Type: *Angasia tetrica* Pilsbry. *Phacellozona* Pilsbry, "Nautilus," vol. vii, p. 139, 1894. Type: *Angasia tetrica* Pilsbry.

Craspedochiton rubiginosus (Hutton, 1872).

— *cuneatus* (Suter, 1908).

Fam. ISCHNOCHITONIDAE Thiele.

Genus ISCHNOCHITON Gray, 1847. Type: *Chiton textilis* Gray.

Ischnochiton maorianus Iredale, Proc. Mal. Soc. (Lond.), vol. xi, p. 36, 1914: Otago Peninsula. Synonym: *Ischnochiton longicymba* Pilsbry, 1892 (not *Chiton longicymba* Blainville, 1825).

— *campbelli* (Filhol, 1880). *Lepidopleurus campbelli* Filhol, Comptes Rendus Sci. Paris, vol. xci, p. 1095, 1880, Campbell Island. Synonyms: *Tonicia gryei* Filhol, ib. id.; *Lepidopleurus melanterus* Rochebrune, Bull. Soc. Philom. Paris, 1883-84, p. 37; *Ischnochiton parkeri* Suter, 1897; *I. fulvus* Suter, 1905.

— *granulifer* Thiele, 1909.

— *luteoroseus* Suter, 1907.

— ? *contractus* (Reeve, 1847) ?

Genus LORICA H. and A. Adams, 1852.

Lorica volvox (Reeve, 1847). Synonyms: *Chiton cimolius* Reeve, 1847; *C. rudis* Hutton, 1872.

Suborder CHITONINA—continued.

Fam. CHITONIDAE Thiele.

Genus *SYPHAROCHITON* Thiele, 1893. *Sypharochiton* Thiele, "Das Gebiss der Schnecken." vol. ii, p. 365, 1893. Type: *Chiton pellisserpentis* Quoy and Gaimard. Synonym: *Triboplax* Thiele, loc. cit., p. 366.

Spharochiton pellisserpentis (Quoy and Gaimard, 1835).

— *sinclairi* (Gray, 1843).

— *torri* (Suter, 1907).

Genus *AMAUROCHITON* Thiele, 1893. *Amaurochiton* Thiele, loc. cit., p. 362. Type: *C. olivaceus* Deshayes. Synonym: *Poeciloplax* Thiele, loc. cit., p. 365.

Amaurochiton glaucus Gray, 1828. *Chiton glaucus* Gray, "Spicilegia Zoologica," pt. i, p. 5, 1828. Synonyms: *C. viridis* Quoy and Gaimard, 1835; *C. quoyi* Deshayes, 1836; *C. quoyi* subsp. *limosus* Suter, 1905.

Genus *RHYSSOPLAX* Thiele, 1893. *Rhyssoplax* Thiele, loc. cit., p. 368. Type: *Chiton affinis* Issel. Synonyms: *Clathropleura* Thiele, loc. cit., p. 367 (not of Tiberi, 1878); *Anthochiton* Thiele, loc. cit., p. 377.

Rhyssoplax acrea (Reeve, 1847).

— *canaliculata* (Quoy and Gaimard, 1835). Synonyms: *Chiton stangeri* Reeve, 1847; *C. insculptus* A. Adams, 1854.

— *clavata* (Suter, 1907).

— *huttoni* (Suter, 1906).

— *limans* (Pilsbry, 1893). *Chiton limans* Pilsbry, Man. Conch., vol. xiv, p. 176, 1893. Synonym: *C. muricatus* A. Adams, 1854, not Tilesius, 1824.

— *suteri* (Iredale, 1910). Synonym: *Chiton stangeri* Suter, 1897, not Reeve, 1847.

Genus *ONITHOCHITON* Gray, 1847.

Onithochiton narmoratus Wissel, 1904. Synonym: *Onithochiton nolosus* Suter, 1907.

— *sabantarcticus* Suter, 1907.

— *neglectus* Rochebrune, Bull. Soc. Philom. Paris, ser. 7, vol. v, p. 120. 1881: Wellington. N.Z. Synonyms: *Chiton undulatus* Quoy and Gaimard, 1835, not Wood, 1828; *Onithochiton astrolabei* Rochebrune, loc. cit., p. 120; *O. fillholi*, id. ib.: *O. decipiens*, id. ib., vol. vi, p. 196. 1882: *O. semisculptus* Pilsbry, 1893.

There is still much to be done in the investigation of the Neozelanic *Chiton* fauna, as, in addition to the preceding, I have unicorns representing two distinct species, and I have two other recognizable species hitherto confused. I have also seen a deep-water *Lepidopleurus* dredged by the Scott Antarctic Expedition.

Fam. Acmaeidae. [P. 62.]

It is doubtful whether this name should be retained, as there is a prior *Acmea* ("Hartmann Neue Alpin." i, 1820) and the two names seem to conflict. I am, however, less concerned with regard to this debatable point after examination of the type species of *Acmea* Eschscholtz. This is a west North American shell, and the Neozelanic shells are decidedly not

congeneric. When the classification used by Australian and Neozelanic malacologists was prepared scientific investigation as to phylogeny as understood to-day was in its infancy, and geography and much else was disregarded. If a shell resembling *Acmæa mitra* was found by a Neozelanic conchologist, I venture to state it would have been classed anywhere but in *Acmæa*. I am convinced that, though Neozelanic malacology has benefited greatly by the research of American workers, it has also suffered through the acceptance of their conclusions as regards generic and specific values, such conclusions being based on little or no material conjoined to an ignorance of local conditions. From 1880 to 1913 the number of forms recognized was raised from 447 to 1187, and this can be said to be the work of one man, Mr. Henry Suter, for, though much collecting was done by others, the bulk of this was due to Mr. Suter's initiative. The work is just commencing in every way, animals and habits being as yet comparatively unknown.

The rejection of *Acmæa* from the New Zealand list is certainly inevitable, and the other names given to northern "Acmæas,"—viz., *Tectura* Gray, *Erginus* Jeffreys, and *Collisella* Dall—are just as unsuitable.

From shell characters the Neozelanic species are easily grouped, and there can be little doubt that animal characters coincidentally agree. I propose to introduce new names for these, and invite investigation and study. These names are equally applicable to Australian forms, and it should be observed that these austral species have no connection with northern forms, "Acmæas" being practically absent from the intervening tropics. By the usage of these names we get a better idea of the relationships of the forms than by the continuance of extra-limital terms which are most doubtfully applicable, and which, judging from shell characters, are certainly untenable.

Radiacmea gen. nov. [P. 63.]

I propose this name for the group of shells around *A. cingulata* Hutton, which I name as type. These agree in shape, external features, and general coloration. According to Suter, the radular characters are "typical, resembling very much that of *A. mitra* Esch." With this species the shell has nothing in common. The shells would come nearer *A. corticata* Hutton, but the radula of this species differs. The group is well marked in New Zealand, but I dissociate Suter's *A. intermedia* and *roseoradiata* from it, and restrict it to *A. cingulata* Hutton and *Fissurella rubiginosa* Hutton.

I did not collect any "Acmæas" at the Kermadecs, nor have I got any from Norfolk Island, nor are there any littoral species from Lord Howe Island, but one small species is commonly dredged. Mr. Oliver has, however, received some specimens of *Radiacmea* from the Kermadecs.

Atalacmea gen. nov. [P. 68.]

I propose this name for the species commonly known as *Acmæa fragilis* Chemnitz. Chemnitz was, however, not a binomialist, and his species-names cannot be accepted. This is undoubtedly true as regards all the preceding ten volumes, but because in the eleventh, where this name occurs, binomials are frequent and polynomials scarce, such binomials have been commonly preserved. Their rejection is inevitable, and it should be noted that these names do not occur in Sherborn's "Index Animalium." The next name appears to be Lesson's *Patella unguis-almae*, which must come into use.

The anatomy of this species is said to differ little from that of other "Acmaeas." I do not agree with this, as the shell characters differ extraordinarily, and in habits this species is no "Acmaea": its habitat and rapid movements are unique in the family, if it be classed correctly.

Notoacmea gen. nov. [P. 71.]

I name as type *Patelloïda pileopsis* Quoy and Gaimard, and would class under this genus the remaining uncharacterized Neozelanic "Acmaeas," with the proviso that probably more than one generic form is here confused. The type shell conchologically resembles that of *Tectura*, of the Northern Hemisphere, and the southern shells were so placed by Thiele, though differences in the radula were shown. The small "Acmaeas," such as *A. daedala* Suter and *A. parviconoïdea* Suter, are easily separated, and might form a subgenus, for which I propose the new name *Parvaacmea*, and name *A. daedala* Suter as type.

If the Neozelanic species were collected and examined in connection with the names here proposed it would at once be seen how natural my groups are, and also that the Australian forms fall into order.

Patelloïda (Quoy and Gaimard, 1834). [P. 73.]

The nomination of some shells from the Montebello Islands, Western Australia, allowed me the opportunity of rectifying the nomenclature of the shells grouped about *A. saccharina* (Linné), and I discovered that this name was applicable to the group named by Suter as *Collisellina* Dall, 1871. The type of *Patelloïda* Quoy and Gaimard was given in the Manual Conch. by Pilsbry as *P. fragilis* Q. & G., but that was an error; also one which would not be easily discovered by the Neozelanic worker. These facts were recorded in the Proc. Zool. Soc. (Lond.), 1914, p. 670.

The Neozelanic species would be named *Patelloïda stella* (Lesson, 1831); *P. pseudocorticata* (Iredale, 1908); *P. perplexa* (Pilsbry, 1891).

I will discuss the status of *corticata*, now admitted as a subspecies, and *pseudocorticata* in my next communication, when I will give figures elucidating my species.

Notoacmea suteri nom. nov. [P. 65.]

Acmaea roseoradiata Suter, 1907, is preoccupied by the prior *Acmaea roseoradiata* E. A. Smith (Journ. Conch., vol. x, p. 106, pl. i, fig. 19, 1901). I had intended that such alterations should have been made by Mr. Suter himself, but as he has written me to the effect that he will be unable to give more attention to the Recent *Mollusca* in the future I herewith propose amendments. Mr. Suter comments: "This pretty little shell is well characterized, and quite distinct from all other known New Zealand species of the genus." I therefore introduce the above as a suitable alternative. I do not, however, class the species in my genus *Radiacmea*, though Suter associated it with *A. cingulata* Hutton. The radular characters are unknown, and the shell differs appreciably to me from *Radiacmea*. Its reference to *Notoacmea* is, however, of a temporary character.

Notoacmea helmsi (E. A. Smith, 1894). [P. 69.]

Under this name I include the shells referred to *Acmaea septiformis* Quoy and Gaimard by Suter, and also class as a variant the var. *leucoma* Suter, 1907, which he referred to *A. parviconoïdea*. Only two localities

are quoted by Suter for *A. helmsi*—viz., Greymouth and Cape Egmont. Examination of the types, however, show it to be a common shell occurring at many points from Lyttelton to Dunedin, and which I had so identified, but ranked as a variety of *A. septiformis* Q. & G. I would reject this latter from the Neozelanic list, as it seems to be the Australian representative of the Neozelanic *A. pileopsis* Quoy and Gaimard. The two species seem liable to extraordinary variation, due to environmental stresses, and really many well-differentiated forms should be recognized in both species. The Australian *septiformis* runs into the form called "*cantharus*," quite wrongly according to my investigations; and at Caloundra, Queensland, I collected two fine shells which immediately recalled large *pileopsis*: they were less elevated, more rounded in outline, and rayed with white rather than spotted; internally they showed the same black edging and light inside coloration. If the Neozelanic and Australian forms be considered separately, and the variation of each carefully studied, much more good would be effected. It does not seem possible with the present material to class *helmsi* as a variant of *pileopsis*, so that a good deal of collecting must be done before much advance can be made in this family. One point I would emphasize is that, from any given place, series of these shells are fairly constant according to their environment.

Notoacmea pileopsis (Quoy and Gaimard, 1834). [P. 71.]

Through usage of alphabetical sequence *Acmaea cantharus* (Reeve) appears five pages away from *Acmaea pileopsis* (Q. & G.). In life there is no such separation. My conclusions put forward in Trans. N.Z. Inst., vol. xi, p. 367, 1908, regarding the identity of these two are therefore not accepted. Further study has not occasioned the revision of my facts, and I would note that since I wrote I have seen that Pilsbry ("*Nautilus*," vol. viii, p. 127, 1895) had recognized the Tasmanian shell as the true *cantharus* Reeve, quoting that Hutton had previously so decided. Pilsbry, however, has never seen Reeve's types, which I have now examined, and I find they are undoubtedly the Neozelanic shell upon which my conclusions were framed. I had thought that it might be possible to rank *cantharus* Reeve as the southern geographical representative of the northern *pileopsis*. I find that this is impossible, as, though Quoy and Gaimard gave as localities Bay of Islands and French Pass, they described and figured a shell quite like *cantharus*. Suter's recognition of both species at the Auckland Islands necessitates the rejection of specific distinction; and, finally, the name *cantharus* is predated.

Patella sturnus Hombron and Jacquinot (Ann. Sci. Nat., 2nd ser., vol. xvi, p. 191, 1841) refers to this species, and as the description applies to the *cantharus* form, and the type was almost certainly collected in Otago, where *cantharus* is abundant, it would have to come into use. It is somewhat remarkable that, while this name passed into the synonymy of *P. radians* Gmelin, the succeeding *Patelloides antarctica* was correctly placed under the present species.

Patella floccata Reeve. [P. 71.]

This name has continually given trouble, and its last resting-place is in the synonymy of *Acmaea pileopsis* Q. & G. I have carefully examined the types of this species, and would suggest it is not a New Zealand shell at all. It is not, from shell characters, an "*Acmaea*" at all, but belongs to the family *Patellidae*.

Patelloïda perplexa (Pilsbry, 1891). [P. 75.]

This is the only species of "*Acmaea*" or limpet at present commonly acknowledged as specifically identical in Australia and New Zealand. Pilsbry's name was given to an Australian shell, and comes into use, as Hutton, who first described it from New Zealand, unfortunately selected a preoccupied name.

A summary of my classification of the New Zealand "*Acmaeidae*" would read,—

Genus *RADIACMEA* nov.

Radiacmea cingulata (Hutton, 1883).

— *rubiginosa* (Hutton, 1873).

Genus *ATALACMEA* nov.

Atalacmea unguis-almae Lesson. Synonyms: *Patella fragilis* Chemnitz, 1795 (non-binomial); *Patelloïda fragilis* Quoy and Gaimard, 1834; *Patella solandri* Colenso, 1844.

Genus *NOTOACMEA* nov.

Notoacmea campbelli (Filhol, 1880).

— *daedala* (Suter, 1907).

— — subsp. *subtilis* (Suter, 1907).

— *helmsi* (E. A. Smith, 1894).

— — var. *leucoma* (Suter, 1907).

— *intermedia* (Suter, 1907).

— *parviconoidea* (Suter, 1907).

— — subsp. *nigrostella* (Suter, 1907).

— *pileopsis* (Quoy and Gaimard, 1834). Synonyms: *Patella sturnus* Hombron and Jacquinot, 1841; *Patelloïdes antarctica*, id. ib.; *Patella cantharus* Reeve, 1855.

Notoacmea scapha (Suter, 1907).

— *suteri* nov. Synonym: *Acmaea roscoradiata* Suter, 1907, not Smith, 1901.

Genus *PATELLOÏDA* Quoy and Gaimard, 1834. Synonym: *Collisellina* Dall, 1871.

Patelloïda stella (Lesson).

— — subsp. *corticata* (Hutton, 1880).

— *pseudocorticata* (Iredale, 1908).

— *perplexa* Pilsbry (1891). Synonym: *Patella octoradiata* Hutton, 1873, not Gmelin, 1791.

Genus *Cellana* (H. Adams, 1869). [P. 78.]

In the synonymy of *Helcioniscus* Dall, 1871, is placed "*Cellana* H. Adams, P.Z.S., 1869, 274; type, *Nacella cernica*, H. Ad." In the *Man. Conch.*, vol. xiii, 1891, Pilsbry (pp. 149-50) noted: "This species is the type of H. Adams's subgenus *Cellana*. It probably belongs to *Helcioniscus* rather than to *Nacella* or *Patinella*. The name *Cellana* has priority over *Helcioniscus*, but it has not been adequately defined."

Under the present laws governing nomenclatural usage the lack of definition does not invalidate a generic name, and consequently *Cellana* must displace *Helcioniscus*. *Helcioniscus* was only provisionally introduced by Dall, who was unaware of H. Adams's *Cellana*.

Pilsbry, in this volume of the *Man. Coch.*, did not use names for *Acmaeas* and limpets in accordance with the rules now in use, and many alterations are now necessary.

Patella antipodum (E. A. Smith, 1874). [P. 79.]

Suter has made use of this name for the species known in New Zealand as *Helcioniscus tramosericus* Martyn. This name having been questioned as doubtfully applicable to the Australian shell, and *P. diemenensis* Philippi used instead, upon Dall's advice Suter utilizes the present name as obviating discussion, being certainly referable to the New Zealand form, whether this be the same or different from the Australian species. It is regrettable that such a pretty argument should be entirely spoiled by the fact that Smith's name is not available. Almost the first shell I noted in the British Museum was this species; and I was surprised—as most conchologists will be when they read this note—to recognize in it a commonplace variation of *Patella radians* Gmelin. In view of its usage by Suter I have consulted Mr. Smith, the author of the species, and he agrees that his *P. antipodum* could be easily classed as a variant of Gmelin's *P. radians*, while he emphasizes the fact that it has no relationship with the Australian shell known as *H. tramosericus* Martyn. Of this I collected a long series, showing variation and growth stages, at Caloundra, Queensland. None of these exactly agree with Martyn's figure.

I have seen no Neozelanic specimens, so cannot say whether they differ or not. I would certainly endorse Suter's remark, "Species of the *Patellidae* have usually a very limited range of distribution." Suter has not described his Hauraki Gulf specimen, but reprinted E. A. Smith's account of his *P. antipodum*, and, as this refers to a different species, there is no description on record of Neozelanic "*tramosericus*."

With regard to the Australian "*tramosericus*," if Martyn's name be rejected the earliest recognizable name is *Patella variegata* Blainville (Dict. Sci. Nat., vol. xxxviii, p. 101, 1825: Botany Bay). This name is, however, preoccupied by Gmelin, so that choice then falls upon *Patella jacksoniensis* Lesson. Zool. Voy. "Coquille," vol. ii, p. 418, 183: Port Jackson, New South Wales. Both these names were rejected by Pilsbry, but any one acquainted with Australian limpets can recognize them with ease. Blainville described half a dozen other limpets at the place quoted, from Australia, and it is just possible that one of these names may also apply; but I hope to elaborate this in another place. This will suffice to show that it is even probable that a name may exist for the Neozelanic "*tramosericus*," though I think not.

Cellana denticulata (Martyn, 1784). [P. 80.]

In his distribution of this species Suter observes, "Hutton also mentions Dunedin and the Chatham Islands." It is pretty certain that Hutton, mainly dependent upon second-hand information, did not recognize our names for the forms accepted. Thus in 1907 I made notes upon the Otago Museum shells, and I observed that under the name *P. denticulata* specimens were shown from Moeraki and Nelson; but these were not that species, but *C. ornata* Dillwyn. I do not know who was responsible for the incorrect nomination, but the adjacent shells were true *C. denticulata* Martyn, and these bore the data "*H. strigilis* var. *redimiculum*, North Island, F. W. H." I should conclude this merely meant that Hutton collected or presented these specimens, but he may also have specifically determined them.

Cellana radians (Gmelin, 1791). [P. 81.]

It may be as well to record that the date of Gmelin's Mollusca is given throughout Suter's work as 1790, whereas it should be 1791 (Hopkinson, P.Z.S., 1907, p. 1035), the earliest date of notice being the 14th May, 1791

First, omit from the synonymy "*P. sturnus*, H. & J., t.c., 191" (a synonym of *N. pileopsis* Q. & G.); and add, "*Patella antipodum* E. A. Smith, Voy. Ereb. & Terr., Moll., p. 4, pl. 1, f. 25, 1874." The forms of this species recognized by Suter I cannot consider well defined.

Patella argentea Quoy and Gaimard, 1834, is untenable through *Patella argentea* Gmelin, Syst. Nat., p. 3704, 1791; also *Patella affinis* Reeve, 1855, by *P. affinis* Gmelin, loc. cit., p. 3726, and *Patella olivacea* Hutton, 1882, by the use of *P. olivacea* Gmelin, loc. cit., p. 3702.

For Hutton's *P. olivacea* I propose the new name *Cellana radians perana*, and would unite with it the so-called "*argentea*."

Suter has reduced to subspecific rank under this species the shell he described as *Helcioniscus mestayerae*. This is not a New Zealand shell. It was supposed to have come from Stewart Island, but when Miss Mestayer showed me the type in 1908 I at once remarked upon its alien features. Miss Mestayer concurred, and suggested that the locality was incorrect. A few days later, at Sydney, Mr. Hedley gave me a specimen agreeing entirely, naming it as *Patella testudinaria* Linné. Into the synonymy of this exotic species, then, must pass *Helcioniscus mestayerae* Suter: Stewart Island (error); and it must be expunged from the Neozelanic list.

Cellana strigilis (Hombron and Jacquinot, 1841). [P. 87.]

I cannot separate, even as a variety, *Patella redimiculum* Reeve, which Suter admits as a distinct species, writing, "The two are very nearly allied." At Shag Point, Otago, I collected a long series showing gradation from the one to the other. Only one species is admitted in the British Museum. The variation in the species is really slight, and when the two forms are studied in life it is easily seen that the elevation or depression is due to environmental stress. At a point in Dunedin Harbour, Otago, I procured many specimens of typical "*strigilis*," leaving no doubt as to their development by stress, as the juveniles were quite typical "*redimiculum*."

Suter records both species from Preservation Inlet, and his measurements of the "*redimiculum*" shell agree almost with a "*strigilis*" from Tauranga to a millimetre—viz., 58 × 47 × 23 mm. and 60 × 48 × 24 mm.

My arrangement of the species of *Cellana* would be,—

Genus CELLANA H. Adams, 1869. Synonym: *Helcioniscus* Dall, 1871.

Cellana sp. ?? Synonym: *Helcioniscus antipodum* Suter, not Smith.

— *denticulata* (Martyn, 1784).

— *ornata* (Dillwyn, 1817).

— *radians* (Gmelin, 1791).

— — var. *decora* (Philippi, 1848).

— — var. *earlii* (Reeve, 1855).

— — var. ? *chathamensis* (Pilsbry, 1891). Synonym: *affinis* Reeve, 1855, not Gmelin, 1791.

— — var. *flava* (Hutton, 1873).

— — var. *perana* nov. Synonyms: *olivacea* Hutton, 1882, and *argentea* Quoy and Gaimard, 1834, not Gmelin, 1791.

— *strigilis* (Hombron and Jacquinot, 1841). Synonym: *P. redimiculum* Reeve, 1854.

— *stellifera* (Gmelin, 1791).

— — var. *phymatia* (Suter, 1905).

A most delightful field of study here reveals itself, as the species and varieties are repeated throughout the Dominion, and there must be a

recognizable cause for the repetition of distinct forms in separate localities. An easily determined form is *Cellana radians* var. *flava* Hutton. This beautiful shell is common at Napier, and lives upon the red sandstone rocks, into which it makes hollows, so that it is difficult to detach without cutting the rock away. Upon the black hard rocks intermingled dark shells are found, and I believe that this yellow form will only be obtained when the soft red rocks are available for its development. Perfectly coloured shells are rare, as might be anticipated.

Montfortula gen. nov. [P. 100.]

Under the genus-name *Submarginula* Blainville, 1825, three New Zealand species are named, two sections being admitted. This nomenclature and classification is incorrect, though Suter is not to blame in the matter, as he simply followed the "Manual of Conchology," wherein the species of this family were monographed by Pilsbry twenty-odd years previously. It is quite remarkable that no corrections have been made since Pilsbry's work was published, and it has apparently been accepted by most workers without question.

Firstly, the genus-name *Submarginula* Blainville, 1825, was accepted. Upon reference to the place quoted (Man. Mal., p. 501, 1825) the name does not occur, but there is only a section of the genus *Emarginula* named "Les Subémarginules." Such an introduction of a vernacular is not recognizable, and it was necessary to trace the first user of the latinized form *Subemarginula*. This search resulted in Gray, Proc. Zool. Soc. (Lond.), 1847, p. 147; type, *Patella octoradiata* Gmelin. This is not the type named by Pilsbry—viz., *Emarginula emarginata* Blainville—but there is no question that *Subemarginula* must date from Gray, 1847, with *Patella octoradiata* Gmelin as type, upon the present facts. *Hemitoma* Swainson ("Treatise Malacology," pp. 244, 356, 1840), with *H. tricostata* Sw., Sow. Gen., fig. 6, was the next synonym, but this appeared to be preoccupied by *Hemitoma* Rafinesque, 1820. Rafinesque, however, proposed *Hemiloma*, and *Hemitoma* was only one of Agassiz's gratuitous manuscript corrections? quoted by Scudder. This species is congeneric with Blainville's *E. emarginata*, and would be the earliest name for the association grouped by Pilsbry under "*Submarginula*."

At this point it became necessary to study the shells, which I casually knew, more carefully, to determine the groups, as it became obvious Pilsbry's grouping was faulty.

Clypidina Gray, 1847, was used by Suter as the sectional name for "*rugosa* Quoy and Gaimard." I collected many specimens of this shell at Sydney, New South Wales, and Caloundra, Queensland. I also procured examples of *Patella notata* Linné at Colombo, Ceylon. This shell is the type of *Clypidina* which was introduced by Gray in the Proc. Zool. Soc. (Lond.), 1847, p. 147. These are entirely different in every manner, and do not show the "internal groove distinct, ending in a short anterior notch," which is given by Suter as the character of the section. The groove is so indistinct that very recently specimens of this Linnean species (Syst. Nat., ed. x, p. 784, 1758) were determined by a well-known conchologist as a new species of *Acmæa*! This memo should indicate how unlike *Clypidina* is to the other "submarginuloid" shells. I regard this as a distinct monotypic genus, and it is so classed in the British Museum.

I also consider *Tugalia*, notwithstanding Pilsbry's opinion, should also rank as a distinct genus, the animal as well as the shell showing good

differential characters. Again, the British Museum classification is in agreement with my own conclusion. The first reference is that in Dieffenbach's "Travels in New Zealand," vol. ii, p. 259, 1843, where the name is written *Tugali*. I see with regard to both this reference and that of *Clypidina* that Suter gives Syst. Dist. Moll. Brit. Mus., though quoting dates correctly as 1843 and 1847 respectively. The book quoted did not appear until 1857. Such action is most confusing, as Suter gives the second reference in his specific synonymy.

Under the genus-name *Hemitoma* Swainson, 1840, a series of shells is arrayed in the British Museum (the genus-name *Subemarginula* not being recognized) which can be easily divided into three groups. No intermediates occur in any way, so that these should be regarded as genera. Examination of the radula will confirm this. The first group consists of *Patella octoradiata* Gmelin alone, and for this *Subemarginula* Gray, 1847, must be used. The second, typified by *tricostata* Swainson, must bear the name *Hemitoma* Swainson, 1840. The names, in the British Museum, associated with species congeneric with this shell are *australis* Quoy and Gaimard, *sculptilis* A. Ad., *panhi* Quoy and Gaimard, *paubiensis* Reeve, *imbricata* A. Ad., *guadaloupsensis* Sowerby, *polygonalis* A. Ad., *nodulosa* A. Ad., and *oldhamiana* G. and H. Nevill. Some of these may be synonyms, and I simply quote them to show the extent of the group and the ease with which species may be determined. To this genus must be assigned *Emarginula emarginata* Blainville, but this specific name is generally abandoned as indeterminable. I would observe that Blainville appears to have previously described this species in the Dict. Sci. Nat. (Levrault), vol. xiv, p. 382, 1819, under the name *Emarginula subemarginata*, but here also the description is indeterminate.

The third group is represented in the British Museum by shells bearing the names *rugosa* Quoy and Gaimard; *candida*, *annulata*, and *stellata*, all of A. Adams; and *fungina*, *aspera*, *radiata*, and *cinerea*, all of Gould. Again, these contain recognized synonyms, but probably other district species could be added. This is the group occurring in the Neozelanic fauna, and it was necessary to find a name for it.

As a synonym of *Subemarginula*, Pilsbry included *Siphonella* Issel, but on p. 284 he dismissed the species thus: "*S. arconatii* Issel (Mal. Mar. Ross., p. 232). Unfigured. Gulf of Akaba." This was easy, but quite unscientific, for on reference to Issel's work I find a long, careful description given, and the group to which the shell belonged is easily determined by the characters, "Testa solidiuscula, capuliformi . . . costis 3 anticis productionibus, media maxima, intus laevi, canali profundo antice munita; apice subcentrali recurvo." *Siphonella* Issel, 1869, thus becomes a synonym of *Hemitoma*; but the name is also preoccupied. As the name of a section, Pilsbry used *Plagiorhytis* Fischer (Man. Conch., p. 860, 1885), and thereto added only *stellata* A. Ad. and *sulcifera* A. Ad. When Fischer proposed this name he regarded *S. rugosa* Quoy and Gaimard as typical of *Subemarginula* Blainville, 1825 = *Hemitoma* Swainson, 1840 = *Montfortia* Récluz 1843 = *Siphonella* Issel, 1869. His definition of *Plagiorhytis* reads, "Rigole oblique et dirigée un peu à droite (*S. stellata* A. Adams)." It would seem, then, that Fischer intended to name the "*emarginata* Blainville" group, but the species named is referable to the "*rugosa*" group. Neither Fischer nor Pilsbry had ever seen Adams's types of *stellata*. Fortunately we are relieved from the decision of fixing Fischer's name, as it is invalid, being preoccupied. In the synonymy Fischer has given "*Montfortia* Récluz,

1843," a name for some unknown reason quite ignored by Pilsbry. In the *Revue de Zool.*, 1843 (Sept.), p. 259, Récluz diagnosed a group and named it "*Montforti* (Nobis). Les Subémarginales Blainville." He wrote, "De cette section . . . nous connaissons six espèces . . . *Em. emarginata* Blainv., *Em. panki* [sic] Quoy, *Em. australis* Quoy, *Em. tricostata* Sow. (*Patella tricostata* Gmelin), *Em. depressa* Blain. et la suivante . . . Nous proposerions de donner à ce nouveau genre le nom de *Montfortia* en l'honneur de Denis de Montfort." On p. 376 the first line given in corrected to "*Montfortia* (Nobis). Les Subémarginules (Blainv.)." I designate as type *E. australis* Quoy and Gaimard, as the Blainvillian species are doubtfully determined; Récluz's species are all congeneric, and the name falls as a synonym of *Hemitoma*.

I have therefore failed in my search for a name for the "*rugosa*" group, and therefore propose the new generic name *Montfortula*, with *Emarginula rugosa* Quoy and Gaimard as type. My study of the shells available at the British Museum, and my knowledge of the live animals of *M. rugosa* (Q. & G.), with species of *Emarginula*, leads me to state that there is a greater alliance between species of *Montfortula* and *Emarginula* than between *Montfortula* and *Hemitoma*, whilst *Subemarginula* Gray, 1847, I suggest differs greatly. As a matter of fact, it is quite probable that study of the shells classed under *Emarginula* would cause the degradation of *Montfortula* to subgeneric rank under that genus. I have to consider many species of *Emarginula* in the Lord Howe Island fauna, when I will carefully deal with that aspect of the case.

The alterations necessary may be summarized thus: Omit *Subemarginula* Blainville, 1825, with its synonymy, and *Clypidina* Gray with its reference, and read,—

Genus MONTFORTULA nov.

Montfortula rugosa (Quoy and Gaimard, 1834).

Genus TUGALIA Gray, 1843, em.

Tugalia parmophoidea (Quoy and Gaimard, 1834).

— *intermedia* (Reeve, 1842).

The synonyms given under *M. rugosa* Q. & G. may not be all correct, but I will attend to those later.

With regards to *Tugalia intermedia* (Reeve, 1842), Suter says, "The type is from Port Jackson." In the original description, however, the locality given is "I. of Bohol, Philippines." The type should be in the Mus. Cuming, preserved in the British Museum, but I have not yet traced it. I mention this as there are Philippine species of this genus.

Genus Trochus (Linné, 1758). [P. 106.]

The classification utilized by Suter is that put forward by Pilsbry in the "Manual of Conchology" twenty-odd years previously, and is one which, as regards generic and subgeneric values, has been discarded for many years even by Pilsbry himself. No recent malacologist, however conservative he may be, sinks *Clanculus* as a subgenus of *Trochus*. A criticism of the series presented in the British Museum shows the species generally classed under *Trochus* to resolve themselves into three distinct rather large groups and several distinct smaller ones.

The generally accepted type of Linné's *Trochus* I have shown to be untenable, as it does not occur in the Linnean genus, and therefore to cause the least confusion I designated as type of *Trochus* Linné (Syst. Nat., ed. x,

p. 756, 1758) the species *Trochus maculatus* Linné (Proc. Mal. Soc. (Lond.), vol. x, p. 225, 1912).

The genus *Tectus* Montfort is well defined and limited, and does not occur on the mainland of New Zealand, but the shell I described from the Kermadecs as *Trochus royanus* (Proc. Mal. Soc. (Lond.), vol. x, p. 225, pl. ix, fig. 12, 1912) must be called *Tectus royanus* (Iredale).

Infundibulum Montfort does not easily fall into any other group, and should be generically recognized, but no members are Neozelanic. *Cardinalia* Gray constitutes another distinct little group, whilst *Trochus niloticus* cannot be easily lumped.

The majority of the other species can be classed around *Trochus maculatus* Linné, the type of *Trochus* Linné, 1758, of which *Lamprostoma* Swainson, 1840, is an absolute synonym. Fischer's *Coelotrochus* and Gray's *Anthora* seem merely sections of this genus, and scarcely seem worth recognition. The species seem to grade very easily. If the section "*Anthora*" be retained, a good excuse being the thickened outer lip, a rather infrequent occurrence in the genus, it must be renamed, as *Anthora* Gray is preoccupied. The new name *Thorista* can be used. The species *Polydonta chathamensis* Hutton, 1873, does not fall into any known Trochoid group, and it is worth while noting that the species is placed under the genus *Gibbula* (sensu latissimo) in the British Museum. Suter has associated subspecifically the shell he described as *Trochus oppressus* var. *dunedinensis*, and "*Trochus*" *oppressus* was described by Hutton under the genus name *Gibbula*. To fix the valid nature of this group it is only necessary to state that on p. 144 Suter has included the species described by E. A. Smith as *Calliostoma aucklandicum* in the genus *Calliostoma*, with the remark, "I have not seen this species." Examination of the types of Smith's species show them to be very close allies of "*chathamensis*," and I see that in the "Hab." of that species "Auckland Islands (Captain Bollons)" occurs. Specimens from Snares in 50 fathoms (Captain Bollons) and Bounty Islands in 50 fathoms (Captain Bollons) appeared to agree with the Auckland Island shell. From the series here available, I conclude the two forms are distinct, and the above localities should be transferred from "*chathamensis*" to "*aucklandicum*."

Inasmuch as the three selections *Trochus*, *Gibbula*, and *Calliostoma* are each unsuitable, and show the peculiar nature of the shells, I introduce the new genus *Thoristella*, and designate *Polydonta chathamensis* Hutton, 1873, as type. The subfamily name is spelt in error on p. 106 "*Trochininae*"; it should be "*Trochinae*." *Trochus* will be retained, as the New Zealand species are congeneric with *T. maculatus* Linné.

The names to be used would be,—

Genus TROCHUS Linné, 1758.

Section *Coelotrochus* Fischer, 1880.

Trochus tiaratus Quoy and Gaimard, 1834.

Section *Thorista* nov. = *Anthora* Gray preocc.

Trochus viridis Gmelin, 1791.

— *camelophorus* Webster, 1906.

Genus THORISTELLA nov.

Thoristella chathamensis (Hutton, 1873).

— — var. *dunedinensis* (Suter, 1987).

— *aucklandica* (E. A. Smith, 1902).

— *oppressa* (Hutton, 1878).

Genus CLANCULUS Montfort, 1810.

Clanculus ringens (Menke, 1843).

— *takapunensis* (Webster, 1906).

Section Melagraphia (Gray, 1847). [P. 115.]

This name must displace *Neodiloma* Fischer, 1885. It appears to have been quite overlooked, as it appears in no recent synonymy I have examined, nor is it included in Scudder's Nomenclator. It is introduced in the Proc. Zool. Soc. (Lond.), 1847, p. 145, as of "Stentz, 1836," for *Tr. aethiops* Gmel. alone. I have been quite unable to trace any publication by Stentz, and have concluded its reference to Stentz implies manuscript usage only. I observed Philippi referred to other names given by Stentz in manuscript to shells in the Berlin Museum.

Labio concolor (A. Adams, 1853). [P. 116.]

Eliminate this name from the synonymy of *Monodonta aethiops* Gmelin, 1791, as examination of the types, preserved in the British Museum, show the locality given to be incorrect, the shells being a form of *Trochus lineatus* Da Costa, a shell I have collected at Torquay, England.

Labio rudis (A. Adams, 1853). [P. 117.]

This is the earliest name given to the "*corrosa*" group by A. Adams, the locality "Australia" being incorrect. It has one page priority over *L. corrosa*, but the name is invalidated by the prior *Monodonta rudis* Gray in King's Survey Coasts Austr., App., p. 480, 1826, which appears to me to be identical with and have priority over the Western Australian *melanoloma* Menke. It is possible that *Labio rudis* has been placed in the synonymy of the Western Australian species, but examination of the types show them to be the commonest form of *corrosa*, such as is easily collected in the Heathcote Estuary, Christchurch.

Trochus acuminatus (Perry, 1811). [P. 124.]

This synonym of *Cantharidus opalus* Martyn, 1784, is not included by Suter. In Perry's "Conchology," pl. xlvii, fig. 1, an easily recognizable figure is given.

Cantharidus capillaceus (Philippi, 1848). [P. 125.]

Suter has used the later *C. pruninus* Gould, 1849, though including the present name in the synonymy. In the Man. Conch., 1st ser., vol. xi, p. 122, 1889, Gould's name was preferred, but that was due to a mistake in dates, the Otia. Conch., p. 55, being quoted as "1846," though the earliest publication of the name is that given by Suter, and the date 1849 is correct.

Cantharidus capillaceus subsp. *perobtus* (Pilsbry, 1889). [P. 125.]

Omit from the "Hab." "Sandfly Bay, Otago Peninsula (T. Iredale)." That refers to the shell I described as *Photinula decepta*, which was named as above by Mr. Suter.

Cantharidus capillaceus var. *minor* (E. A. Smith, 1902). [P. 125.]

From examination of the types, I believe this to be a distinct species, which I will deal with later.

Cantharidus oliveri nom. nov. [P. 126.]

I propose this name for the species described by Suter under the name *Cantharidus pupillus* Hutton, 1884. Hutton did not describe this shell as a distinct species, but simply made use of Gould's name. This misinterpretation cannot be utilized as the basis of a name: this law has been universally accepted, and Suter has constantly admitted it.

Hedley wrote his conclusion thus (Proc. Linn. Soc. N.S.W., vol. xxxiv, p. 436, 1909): "Born never proposed his *Patella tricarinata* as a new species, so that when it is accepted that he did not treat of the Linnean *P. tricarinata* his name has no standing in literature." In case I have no other opportunity, I would point out that the name selected by Hedley on that occasion—viz., *Emarginula clathrata* Adams and Reeve, 184 —is antedated by Deshayes's usage (Ency. Meth. Vers., ii, p. 111, 1830).

I name the *Cantharidus* after my friend Mr. W. R. B. Oliver, who accompanied me on my many collecting trips in New Zealand.

Cantharidus lineolaris (Gould, 1861). [P. 130.]

Hedley (Proc. Linn. Soc. N.S.W., vol. xxxiii, p. 466, 1908) has shown that this name, published in the Proc. Bost. Soc. Nat. Hist., vol. viii, p. 14, 1861, has priority over H. and A. Adams's name *picturatus* of 1863. If the locality "Stuart Island" be the only one known, it would seem to be a doubtful constituent of the New Zealand fauna. The sections *Bankivia*, *Leioptyrga*, and *Thalotia* would be best treated as genera; but I hope to deal with the species of *Cantharidus* at a later date. *Thalotia* is generically recognized in the British Museum collection, as is also *Bankivia*, but *Leioptyrga* is given subgeneric rank under the latter.

Calliostoma tigris (Martyn, 1784). [P. 148.]

Add as a synonym *Turbo granatum* Bolten, Mus. Bolten., p. 88, 1798. This name is given to Der Granat-Apfel (T. Martin. Univ. Conch., 2, fig. 75), so that the synonymy is exact.

Margarella decepta (Iredale, 1908). [P. 133.]

I will shortly give a figure of the shell I described as *Photinula decepta*, which has not yet been figured. It closely resembles *Photinula violacea* (Sowerby), and must be classed in the same genus. From examination of the radular characters the species of the *caerulescens* group (true *Photinula*) have been separated from the forms allied to *violacea*. Such a separation is amply confirmed by shell characters, so that *Photinula* can be dismissed from the Neozelanic fauna. I was the first to introduce it in connection with the species under discussion, and I did so on account of the apparent close relationship with *violacea*, which I only knew from literature. For the *violacea* group Thiele proposed (Gebiss d. Schnecken, vol. ii, p. 259, 1891) *Margaritella*, quoting *violacea, expansa*, and the New Zealand *antipoda*. The genus-name being preoccupied, he has since amended it to *Margarella*. This name should be used. Suter has rejected this name, using *Photinula*, making the remark, "Thiele included in his genus *Margarella* our species *P. nitida* and *P. antipoda* because the dentition shows a close resemblance. *Margarella* stands, no doubt, nearer to *Valvatella*, the animal having jaws." The conchological features of *antipoda*, *decepta*, and *violacea* are essentially identical, whilst *nitida* shows quite different features.

The first three must be grouped together, whilst the last must be separated; and though the shell described as *Photinula suteri* by Smith has been classed in *Gibbula* by Suter on account of the presence of jaws, it is much nearer *Margarella*, and I would there place it for the present. I believe, from a criticism of the shells—and this is confirmed by examination of the radula—that the recognition of the jaws depends too much upon the personal equation, and cannot in the present state of our knowledge be depended upon. I would therefore reject *Photinula*, and replace it by *Margarella*, and recognize three Neozelanic species, thus:—

Genus MARGARELLA Thiele. Synonym: *Margaritella* Thiele, 1891, not Meek and Heyden, 1860.

Margarella antipoda (Hombron and Jacquinot, 1854). Synonym: *Chrysostoma rosea* Hutton, 1873.

---- *decepta* (Iredale, 1908).

---- *suteri* (E. A. Smith, 1894).

I see no good purpose in retaining Hutton's name *rosea* for a variety, as the colour-variation is endless, and there is no definition.

Gibbula nitida Ad. & Ang., 1864, which Suter placed in *Photinula* because the animal had no jaws, is certainly not congeneric with the above, and shows a much closer relationship with *G. picturata* of the same authors, which Pilsbry made the type of *Cantharidella*, a section of *Gibbula*. Jaws are said to be present, but neither of these species has a very close relationship to *Gibbula*.

Genus Solariella Searles Wood. [P. 140.]

Under this genus-name in the British Museum is placed the shell known to Neozelanic collectors as *Monilea egea* Gould. It should be remembered that this generic (*Monilea*) location was simply Hutton's solution, as Pilsbry in his monograph states he did not know it, and therefore followed Hutton. To my eyes the Neozelanic shell was not congeneric with *Monilea*, but was nearer *Minolia*, which Suter used subgenerically for some other Neozelanic species. I could not see any subgeneric difference between these, and they seemed well placed in *Solariella*.

Mr. E. A. Smith has just told me that he cannot determine *Monilea* Swainson, that he cannot separate *Minolia* from *Solariella*, and that all the Neozelanic species are congeneric. His conclusions will be published before this is in print, but it is certain that *Monilea* must be rejected, and in its stead *Solariella* may be used, and all the Neozelanic species be so classed.

Fam. Trochidae. [P. 150.]

Add: Genus ANGARIA Bolten. *Angaria* Bolten, Mus. Bolten., p. 71, 1798. Type: *Turbo delphinus*, Linné. Synonym: *Delphinula* Lamarck, &c.

This genus has not yet been recorded from New Zealand, though I have recorded two species at the Kermadec Islands. From dredgings made at that place I sorted out many minute shells, and a long series enabled me to recognize the growth stages of this genus. They show no form or sculpture at all like the adult, and do not appear to have yet been figured. The two species, *Liotia serrata* Suter, 1908 (p. 151), and *Liotia solitaria* Suter, 1908 (p. 152), are probably both juveniles of this genus: the latter certainly is, whilst the species Suter compared it with—viz., *L. stellaris* Ad. & Rve.—is also a juvenile *Angaria*, as is shown here in the British Museum, the type being so placed when it was described.

The presence of the genus in north Neozelanic waters is not strange, as it occurs on all the three northern groups—Lord Howe Island, Norfolk Island, and the Kermadecs. From the two former it is as yet known only by juvenile and half-grown specimens dredged, but at the Kermadecs one species was rarely obtained, alive and adult, below low water. The juveniles dredged show great variation, so that I cannot refer Suter's two species to any named species, nor decide whether they are conspecific. The only conclusion under such circumstances is to admit both, and draw attention to the matter, so that adults may be looked for. Will northern collectors please note.

Genus *ANGARIA* Bolten, 1798.

Angaria serrata (Suter, 1908).

— *solitaria* (Suter, 1908).

Fam. *Liotiidae* Iredale. [P. 150.]

I propose this family name for quite a different association to the family *Liotiidae* Gray, used by Pilsbry and Suter. That name is based upon the usage of *Liotia* for the shells with heavily varicosed aperture, and operculum with a calcareous superimposition in the form of spirally disposed particles. No member of this group inhabits New Zealand as far as is yet known, though I collected a typical species at the Kermadecs.

In the Proc. Mal. Soc. (Lond.), vol. ix, p. 257, 1911, I showed that *Liotia* Gray was proposed for the shells typified by *Delphinula cancellata* Gray, and that species did not possess a variced mouth nor a calcareous operculum. The name for these latter I also concluded was *Liotina* Fischer (Man. de Conch., p. 831, 1885), with type *L. gervillei* DeFrance. I have since recognized that the type of *Liotia* agrees with *Cyclostrema micans* A. Adams in every essential particular. The types of both are before me. As this was selected by Tate as typical of a new genus *Pseudoliotia*, that name falls as an absolute synonym of *Liotia* Gray. The species classed by Suter under *Liotia* have no relationship with that genus.

On p. 152 the family *Cyclostrematidae* Fischer is admitted. This would partly represent my family *Liotiidae*.

On p. 153 the genus *Cyclostrema* is utilized for a species—*Cyclostrema eumorpha* Suter. Suter's arrangement is based upon that proposed by Miss Bush after a study of west North American forms. I have investigated the austral species in view of Miss Bush's conclusions, and cannot advise that the groups there proposed should be introduced into Neozelanic literature. Miss Bush, however, killed the ghost of *Cyclostrema*, as it appeared that no one previously had examined the matter, but simply used *Cyclostrema* as a "waste-paper basket" for puzzling minute Trochoids. I am sorry that this usage still persists, a chief offender being Melvill, who wrote upon the *Cyclostrematidae* of the Persian Gulf (Proc. Mal. Soc. (Lond.), vol. vii, pp. 20-28, 1906), and has since described species of "*Cyclostrema*" most obviously not congeneric with the type. The genus "*Cyclostrema*" was proposed for a shell found among some West Indian forms. The type is lost, and the nearest species known comes from the Philippines. I have often studied the figure and description of Marryat's genus and species, and these seem to represent an immature shell which might have developed into a species of what I call *Liotina*. I would suggest that the name be dismissed as indeterminate, especially as it has been so casually used in no scientific manner.

On p. 154 *Delphinoidea* is included, but the species so classed bears little resemblance to the British shell, which is the type of the genus.

On p. 157 Miss Bush's fam. *Vitrinellidae* is admitted, but the shells placed under this name bear little or no resemblance to *Vitrinella*, and the name should be dismissed at once from Neozelanic literature.

Miss Bush's *Lissospira* is also introduced for the minute turbinate species, *corulum* Hutton, 1885, and *micra* Tenison-Woods, 1877. The former of these has little resemblance to the species of *Lissospira*, and I have already proposed to separate it generically. The latter bears only superficially the aspect of species of *Lissospira*. Moreover, Miss Bush recognized as a sub-genus of *Lissospira* the genus *Ganosa* Jeffreys. That name has long priority, but the species are quite unlike the austral species.

Thiele has shown that most of the Antarctic shells, which closely resemble boreal species—so much so that previous workers had considered them congeneric—showed vast differences when the animals were examined. In my own case, I cannot separate shells of *Heterorissoa* and *Jeffreysia*, yet the opercula notably differ, and Thiele has been able to recognize several genera in the southern so-called "*Jeffreysia*."

Under these circumstances, I unhesitatingly reject *Lissospira*, and also *Cyclostremella* Bush, admitted by Suter on p. 160. This latter genus was proposed for such a shell as the Australian *Cyclostrema charopa* Tate, but Thiele has differentiated an Antarctic genus under the name *Microdiscula*. The austral species I would class under this name rather than under Miss Bush's, especially as she writes, "Nuclear whorl relatively large, turned downward, seen only in a basal view, leaving a small pit above." No austral form I have examined shows this character. Suter's *Cyclostremella neozelanica* seems to show no affinity with either *Cyclostremella* Bush or *Microdiscula* Thiele, but differs in almost every particular, as will be hereafter shown.

Circulus Jeffreys is, on p. 159, introduced into the Neozelanic fauna to include a shell very closely allied to "*Cyclostreme*" *tatei* Angas. There is quite a large group of Indo-Pacific shells agreeing vaguely in character with *C. tatei* Angas, but these do not correlate with the type of *Circulus* when actual specimens are compared.

The whole of the Neozelanic and Australian species bear a different look when specimens (not descriptions and illustrations) are brought alongside European forms, and I advocate the rejection of European names until animals are examined.

I herewith introduce four new generic names for usage in connection with the Neozelanic forms, and most of these will come into use for Australian species. I have collated some sixty generic names proposed for shells of this group, and I have examined the types of the majority of these genera and most of the species, both fossil and Recent, allotted to the genera named, in the hope that I may at some time produce a monograph of the whole group. In addition to the named forms, I have many unnamed species from the Kermadec Islands, Lord Howe Island, and Norfolk Island, and these have been utilized in consideration of the groups here named. The usage of these would certainly obviate such incongruous assemblage as my friend Mr. Hedley (Proc. Linn. Soc. N.S.W., vol. xxxiv, 1909) has produced in classing figs. 40, 41, 42, 43, 44, 45 on plate xxxix as *Liotia*, and figs. 46, 47, 48, pl. xxxix, and figs. 49, 50, 51, pl. xl, as *Cyclostrema*.

Liotella gen. nov. [P. 151.]

I introduce this genus-name to cover a series of minute shells which have been classed by Australasian workers in *Liotia*, but which differ in their texture, do not possess a thickened peristome, and are more or less loosely coiled. I name as type *Liotia polypleura* Hedley, a species I am very familiar with, and that shell has a multispiral horny operculum with a central nucleus. The second species on p. 151 (*Liotia rotula* Suter) would be here classed, and I would suggest the addition of *Liotia annulata* Ten-Woods (Proc. Roy. Soc. Tasm., 1877, p. 121, 1878); *Liotia anxia* Hedley (Proc. Linn. Soc. N.S.W., vol. xxxiv, p. 437, pl. 39, figs. 43-45, 1909); *Liotia petalifera* Hedley (Rec. Austr. Mus., vol. vii, p. 116, pl. 22, figs. 6-8, 1908); *Liotia disjuncta* Hedley (Mem. Austr. Mus., iv, p. 336, fig. 66 in text, 1903); and *Homalogyrra pulcherrima* Brazier (Proc. Linn. Soc. N.S.W., vol. ix, p. 175, pl. 14, fig. 13, a, b, 1894). These are all obviously neither *Liotia* nor *Liotina*, and, though I suggest all are not congeneric, the present location is good as a temporary one, though not permanent.

Zalipais gen. nov.

Suter described a minute shell as *Cyclostrema lissum* in 1908, and he now disposes of it in *Delphinoidea* Brown. That genus is based upon a British shell which I do not consider congeneric with Suter's *C. lissum*, which was one of my first discoveries when investigating the minutiae found living in seaweeds in tide-pools at dead low water on the New Zealand coast. I sent Mr. Suter specimens for examination from Blind Bay, Nelson, in addition to the localities he mentions, and I also obtained it at Sandfly Bay, Otago Peninsula. It is probably well distributed, but we have knowledge of very little of the New Zealand minute marine molluscs as yet.

I propose the above generic name, naming *C. lissum* Suter as type, and anticipate many additions. I have another Neozelanic species, yet undescribed, before me, but at present I do not know any Australian species I would refer here.

Lissotesta gen. nov.

I mentioned to Mr. Suter in 1907, when I passed through Auckland on my way to the Kermadec Islands, that I had written to Mr. Hedley asking his opinion with regard to *Cirsonella? neozelanicum* Murdoch. I had compared the type of *Cirsonella*, and from shell characters it was not congeneric, and the anatomical details given by Murdoch confirmed this conclusion, whilst the operculum made the rejection of the species from *Cirsonella* certain. Mr. Hedley has replied suggesting *Assimineia*, and agreeing with my opinion. On p. 155 *Cirsonella neozelanicum* is included, but on p. 1082 there is a note quoting Thiele's investigation and its tentative reference to *Aemella* in the subfamily *Omphalotropidinae* of the family *Pomatiasidae*, which is certainly a much better location.

The first species, *Cirsonella densilirata* Suter, 1908, is certainly correctly placed under the genus *Cirsonella* in the present state of our knowledge, but the third species, *Cirsonella granum* Murdoch and Suter, 1906, I would remove to my genus *Lissotesta*, which I here propose for the shells about *Cyclostrema micra* Ten-Woods, 1877, which I name as type. Yet Suter has placed the former in the family *Cyclostrematidae*, and the latter in the family *Vitrinellidae*.

These "featureless" "Cyclostrematids" are difficult to place from figures and descriptions alone, but the two here mentioned are conchologic-

ally as alike as any of these things are. Thus I would here place *Cyclostrema torridum* Hedley (Proc. Linn. Soc. N.S.W., vol. xxxiv, p. 438, pl. 40, figs. 49-51, 1909); and I at one time considered *C. porcellanum* Tate and May would belong here, but examination of specimens in the British Museum, marked "co-types," shows this species to have an oval aperture quite repugnant to my genus, and recalling shells I collected in New Zealand and which from opercular characters were referred to *Laevilitorina*.

Eiachorbis gen. nov.

On p. 153, under *Cyclostrema*, Suter has placed his own *Cyclostrema eumorpha*, and on p. 159, under *Circulus*, he has ranged his *Cyclostrema sublatei*.

There is a large group of minutiae similar in general characters to *Cyclostrema tatei* Angus, and I propose the above genus for these, with that species as type. There cannot be recourse to *Cyclostrema*, as already pointed out, and *Circulus*, from examination of the type, would be a bad substitute.

Melvill has described a whole series of species from the Persian Gulf under the genus-name "*Cyclostrema*" which would come into this genus. Melvill's idea of "*Cyclostrema*" as further exemplified in the Trans. Roy. Soc. Edinb., vol. xlviii, 1912, pp. 345-46, is about as vague as the Linnean *Helix*, as he admits "this genus is somewhat multifarious already in its component parts."

Leptothyra imperforata (Suter, 1908). [P. 156.]

This is where I should place the shell named *Pseudoliotia imperforata* by Suter. *Pseudoliotia* Tate, from examination of types, agrees exactly in every detail with *Liotia* Gray, and must be ranked as an absolute synonym of that name.

I have not seen Suter's species, but the description and figure agree very closely with the type of *Leptothyra*, and until the opercular characters are known this should be its generic location.

When Hedley introduced *Liotia latebrosa* (Proc. Linn. Soc. N.S.W., vol. xxxii, 1907, p. 493) he commented, "The shell resembles *Leptothyra*, but the operculum is of a different type. It seems to me probable that neither *Leptothyra* nor *Collonia* occurs in Australasian seas, and that the species which have been ascribed to them ought to be transferred to *Liotia*." This was written before I had shown that *Liotia* Gray was not *Liotia* Auct., and with our present knowledge it is quite impossible to class Hedley's *Liotia latebrosa* with either *Liotia* Gray (= *Pseudoliotia* Tate) or *Liotina* Fischer (= *Liotia* Auct.).

Hedley admitted (loc. cit., p. 479) *Leptothyra laeta* Montrouzor, and this fairly agrees with typical *Leptothyra*. The species I found at the Kermadecs and recorded as *Leptothyra picta* Pease is also quite a typical shell. The present species does not closely resemble *Cyclostrema micans* A. Adams, but recalls *Collonia roseopunctata* Ten-Woods, and this would also range under *Leptothyra*.

The species Suter includes in *Leptothyra* (pp. 164-65) are not congeneric, and I will deal with these when I arrive at those pages.

Brookula corulum (Hutton, 1885). [P. 158.]

The shell described as *Scala corulum* by Hutton was temporarily placed under *Cyclostrema* by Suter and myself in 1908. Suter now ranks it under

Lissospira, which it disagrees with in almost every particular. I have introduced (Proc. Mal. Soc. (Lond.), vol. x, p. 219, 1912) the genus-name *Brookula*, with type the Kermadec species *B. stibarochila*, and the group thus named is quite a large one, and well defined.

Liotella ? *neozelanica* (Suter, 1908). [P. 160.]

Suter's *Cyclostremella neozelanica* is autoptically unknown to me, but it is obvious that it is not a *Cyclostremella*. I have seen species somewhat recalling Suter's figure and description, and until I know them better I would class them as close relations of *Liotella* spp.

My disposition of the species ranked by Suter in the families *Liotiidae*, *Vitrinellidae*, and *Cyclostrematidae* (pp. 150-61) are as follows:—

Transfer *Liotia serrata* Suter, 1908, and *Liotia solitaria* Suter, 1908, to the genus *Angaria* Bolten, 1798, in the family *Trochidae*. Transfer *Cirsonella neozelanica* Murdoch, 1899, to the genus *Acmella* in the family *Pomatiasidae*. Transfer *Pseudoliotia imperforata* Suter, 1908, to the genus *Leptothyra* in the family *Turbinidae*. The remainder may be classed in the family *Liotiidae* Iredale, as hereafter named:—

Fam. LIOTIIDAE Iredale.

Genus LIOTELLA nov.

Liotella polypleura (Hedley, 1904).

— *rotula* (Suter, 1908).

— ? *neozelanica* (Suter, 1908).

Genus ELACHORBIS nov.

Elachorbis eumorpha (Suter, 1908).

— *subtatei* (Suter, 1907).

Genus ZALIPAIS nov.

Zalipais lissa (Suter, 1908).

Genus CIRSONELLA Angas, 1877.

Cirsonella densilirata (Suter, 1908).

Genus BROOKULA Iredale, 1912.

Brookula corulum (Hutton, 1885).

Genus LISSOTESTA nov.

Lissotesta micra (Ten.-Woods, 1877).

— *granum* (Murdoch and Suter, 1906).

There are many species and genera living in Neozelanic waters to reward the worker who will undertake search for these delightful minutiae. I have before me at this time more than half a dozen species representing genera new to the Neozelanic list and others referable to the above-named genera.

Subgenus *Lunella* (Bolten, 1798). [P. 162.]

“*Marmorostoma* Swainson, 1840; type, *T. porphyreticus* Mart.,” is utilized by Suter in a subgeneric sense for *Turbo smaragdus* Martyn. This name is untenable in this connection, as it was first proposed by Swainson in the Zool. Illus., 2nd ser., vol. i, 1829, pl. 14, where he wrote, “From the genera *Turbo* and *Trochus* of modern conchologists we have detached all those species whose shells are closed by a calcareous [sic] operculum; and this group we propose to distinguish by the name of *Marmorostoma*.” He then named as type “*Turbo chrysostomus* L.”

In the “Treatise on Malacology” (1840, p. 215) Swainson amended this proposal thus: “Before we had sufficiently studied this family we

included the foregoing in our genus *Marmorostoma*, but we intend to limit that name to the umbilicated division of Humphrey's *Senectus*, represented by the *M. versicolor* (*Turbo versicolor* Martini, pl. 176, figs. 1740, 1741)." Such a transposition of names is not permissible, and the first usage of *Marmorostoma* prohibits its use in any connection, as it falls as an absolute synonym of *Turbo* s. str. In Trans. N.Z. Inst., vol. xxxviii, 1905, p. 324 (1906), Suter wrote, "The subgenus *Lunella* Bolten, 1798, used by Webster, should be replaced by *Marmorostoma* Swainson, 1840, as most conchologists reject the names proposed by Bolten." At the present time the converse is the case, as practically every systematist now recognizes the Boltenian genera. The chief antagonist (Mr. A. J. Jukes-Browne) of the Boltenian genera has recently passed away, and I at present know of no other opponent.

Lunella Bolten (Mus. Bolten., p. 103, 1798) can therefore be used instead of the doubly invalid *Marmorostoma* Swainson, 1840, which, if quoted in the synonymy, should be accompanied by the words "not of Swainson, 1829."

Turbo smaragdus (Martyn, 1784). [P. 162.]

To the synonymy of this species add (*Helix*) *Smaragdus minor* Martyn (Univ. Conch., vol. ii, pl. 74, 1784), *Turbo smaragdinus* Bolten (Mus. Bolten., p. 86, 1798).

I notice with pleasure that Suter has also included *Turbo smaragdus* var. *tricostatus* Hutton, 1884. My own collecting led me to endorse Suter's suggestion (Trans. N.Z. Inst., vol. xxxviii, 1905, p. 324, 1906) that "further investigation will show that all young shells of *T. helicinus* (= *smaragdus*) are tricostate." The plate given by Martyn, and named as above, shows two beautiful paintings of half-grown shells which clearly portray the tricostate stage, and if such had been separable Martyn's name, given just one hundred years before Hutton's choice, would have claimed usage.

Another synonym, which I will later discuss, seems to be *Omalogyra bicarinata* Suter (Proc. Mal. Soc. (Lond.), vol. viii, p. 33, 1908).

Argalista gen. nov. [P. 164.]

I propose this generic name for *Cyclostrema fluctuata* Hutton. This species, along with *Leptothyra crasscostata* Murdoch, belongs to a group confused with *Leptothyra* and *Collonia*. The true species of *Leptothyra* are very different shells, with different opercular characters. *Collonia* is a name that has been recently restricted to fossil shells somewhat recalling *Argalista*, but the name is so uncertain that it cannot be here recommended for usage.

I have before me new species of *Argalista*, and Hedley has described *Liotia latebrosa* in 1907 (see under *Leptothyra imperforata* Suter, ante) and more recently *Leptothyra fugitiva* (Zool. Res. Fish. Ex. "Endeavour," pt. i, p. 102, pl. 18, figs. 18-20, 1911), which probably, with *Teinostoma rotatum* Hedley (Mem. Austr. Mus., iii, p. 553, fig. 65 in text, 1899) and many other species, would fall into the present genus.

Astraea sulcata (Martyn, 1784). [P. 167.]

As a synonym, add *Cidaris novaezeelandiae* Bolten (Mus. Bolten., p. 85, 1798). This name is given to Der neuseeländische Turban (Chemn., 5, t. 164, fig. 1550). The figure is numbered 1551, and is easily recognizable.

Genus *Phasianella* (Lamarck, 1804). [P. 168.]

Many synonyms might here be added. The following refer only to the typical section, and are absolutely exact:—

Phasianus Montfort. *Conch. Syst.*, vol. ii, pp. 254–55, 1810 (not *Phasianus* Linné, 1758).

Bolina Rafinesque. "Analyse Nature," p. 144, 1815. *Orthopnoea* Gistel, *Naturg. Thierr. Schul.*, p. 169, 1848. Both these are simply substitute names for "*Phasianella* Lam."

Entropia Humphrey was quoted by Swainson (*Treat. Mal.*, p. 21, 1840) as being equal to *Phasianella* Lam., and was so used by Adams Bros.

Entropia H. and A. Adams. *Gen. Rec. Moll.*, vol. i, p. 389, 1854.

Genus *Umbonium* (Link, 1807). [P. 170.]

Umbonium Link, *Beschr. Samml. Rostock.*, 1807. Type: *Trochus vestiarius* Linné.

As synonyms may be noted *Globulus* Schumacher, 1817, and *Rotella* Lamarck, 1822. A full synonymy will be given later.

This genus is not clearly defined from *Ethalia* A. Adams, which Suter has used, following Pilsbry, for the New Zealand shell "*Ethalia zelandica* H. & J." In the British Museum *Ethalia* is only given subgeneric rank, which looks natural to me; but whatever value is hereafter accorded *Ethalia* I conclude that the Neozelanic shell will be classed in *Umbonium*. It is so placed in the British Museum. *Ethalia* is much younger, in date, than *Umbonium*, but even if used subgenerically the Neozelanic shell would fall into *Umbonium* s. str. *Ethalia* must be altogether eliminated from Neozelanic usage.

Umbonium anguliferum (Philippi, 1853). [P. 170.]

Globulus anguliferus Philippi, given by Suter in the synonymy of "*Ethalia zelandica* Hombron and Jacquinot, 1854," was really published in 1853, and therefore has clear priority over the name assigned to Hombron and Jacquinot, but only published by Rousseau in 1854.

The reference to the genus *Ethalia* is due to Pilsbry's initiative when he monographed the group in the "Manual of Conchology." I cannot understand his argument, as he referred Crosse's *U. thomasi* to *Umbonium*, and these two species are very nearly allied, and certainly congeneric. I note he has since indicated that the traditional identification of Quoy and Gaimard's *guamensis*, the type of *Ethalia*, may be incorrect. However, A. Adams (*Proc. Zool. Soc.*, 1853, 188 (1854)) proposed two new species of *Umbonium*—*U. zelandicum* and *U. chalconotum*. These are synonyms of the present species, and they are not congeneric with H. and A. Adams's *Ethalia guamensis*, which is now before me, whether this be Quoy and Gaimard's species or not. The first introduction of *Ethalia* is by H. and A. Adams, *Gen. Rec. Moll.*, vol. i, p. 409, May 1854. The type is "*guamense* Quoy & Gaim."

Genus *Murdochia* (Aucey, 1901). [P. 177.]

I would like to see this name come into use for the Neozelanic shells at present classed in *Lagochilus*. All Neozelanic workers, as well as extralimital malacologists, deeply regret the withdrawal of Mr. R. Murdoch from the active study of the Neozelanic molluscan fauna.

My reasons for the recognition of *Murdochia* are that *Lagochilus* Blandford, 1864, is antedated by the prior names *Lagochilus* and *Lagochile*. These names are being considered near enough to invalidate Blandford's name by most present-day workers. *Cytora* Kobelt and Moellendorff, 1902 or 1897, is long predated by *Cytorus*, and is therefore unavailable.

Genus *Palaina* (Semper, 1865). [P. 185.]

The reference to *Palaina* is not given, and, as I had occasion to look it up, it may be here noted:—

Palaina Semper, Journ. de Conch. vol. xiii. p. 291, 1st July, 1865. Synonym: *Pupoides* Pease, Amer. Journ. Conch., vol. i, p. 290, 1st October, 1865.

Suter notes that the occurrence of the species in New Zealand requires confirmation.

I have examined the type, and it closely approaches some forms from Lord Howe Island, but though I have tried to match it I have not yet succeeded. The Lord Howe land molluscan fauna is so certainly derived from that of New Caledonia that search in that island may reveal the habitat of the supposed Neozelanic shell. My criticism of the type leaves no doubt that it came from New Zealand, New Caledonia, or Lord Howe Island.

Genus *Melarihappe* Menke. [P. 186.]

I have recorded my conclusion (Proc. Mal. Soc. (Lond.), vol. x, p. 223, 1912) that this genus-name should replace *Littorina* for usage for the Australian shells commonly so called. Suter has given the correct reference to this name, but the type I named as *M. neritoides* (Linné). The species-name (p. 188) *mauritanica* Lamarek, 1822, should be rejected, as the Mauritian shells are much larger and easily separable. The next name is *L. unifasciata* Gray, 1826, given to an Australian shell, and this may be used, but I think the Neozelanic shell may prove subspecifically separable. A long series I collected at Caloundra, Queensland, were fairly constant, and showed slight differences, but I will later discuss these differences in more detail than I can at present.

Fam. Rissoidae Gray. [P. 198.]

"Rissoids" have given trouble to all systematists, on account of their small size. Few malacologists have deigned to study them, and most conchologists have utilized the name for any minute shell which could not be conveniently elsewhere placed. Hence, to the serious systematist "*Rissoa*" is the most displeasing name on record. I drew up a scheme for the differentiation of Australian "Rissoids" some six years ago. Unfortunately, my MS. was lost while travelling, and it has taken much study to arrive at a satisfactory appreciation of the austral forms in conjunction with the European forms. These latter have been generically divided and subdivided until there are about two generic names provided for each species.

With such a multiplicity of names available it seemed only a matter of comparison to select those suitable for Neozelanic shells, and then correlate synonyms. The Norman collection of palaeartic molluscs is now preserved in the British Museum, and such a wealth of material can scarcely be understood by the Neozelanic student. Series of shells from varied localities showing all growth stages and variation, with paratypes from most European workers, are there exhibited. I made a careful study of this

collection as regards these shells, and was astonished at my results. I had first collated all the generic, subgeneric, and sectional names proposed, with the types given by their author or the next worker to select such. *Rissoa* has had three types, named by three workers, and, whichever of these be considered the genus-name, *Rissoa* must be eliminated from Neozelanic literature.

I now propose a scheme of nomination adapted to austral species, and would urge its acceptance by austral students. It may seem at first arbitrary and in some ways inconsistent, but I believe it to be based on sound principles. It is the result of consideration of European Rissoids, both Recent and fossil, in conjunction with Australian, Neozelanic, and Lord Howe, Norfolk Island, Kermadec, and Lifu species. I deliberately mention these islands as I have many species from these groups, and these have reinforced the opinions produced by the study of the Neozelanic species alone.

Suter has accepted the genus *Rissoa*, admitting six subgenera—*Rissoa* (s. str.), *Alvania*, *Onoba*, *Ceratia*, *Cingula*, and *Setia*. As distinct genera he includes *Amphithalamus* and *Anabathron*.

More space than would be here allotted is required to record all the vicissitudes of Rissoid classification as regards austral forms. Here it can be noted that Hedley (Zool. Results "Endeavour," pt. i, p. 105, 1911) has rejected *Rissoa*, with type *Turbo cimex* L., as available for many austral species, and has substituted *Amphithalamus*. I do not agree with his association of species under the latter name, and these I will hereafter discuss. The type of *Rissoa* named by Hedley is the type of *Alvania*, so that name must also be omitted from consideration in connection with these species. The shell Suter names as type of *Rissoa* appears to have the best claim, but that will be discussed fully elsewhere.

Onoba, I conclude, can be used for certain Neozelanic shells without recourse to animal characters. *Ceratia* would be also available, but it is preoccupied. *Cingula* has no representative in New Zealand, whilst *Setia* is also preoccupied.

My scheme necessitates the introduction of new generic names for austral groups, and I would at once protest against the action of some conchologists who, without making any study of the subject, throw all new names into synonymy. If these minutiae be carefully studied, I prophesy the proposal of many more genera rather than the rejection of the few I separate.

Firstly, there is an austral group oscillating about *Rissoa cheilostoma* Ten.-Woods. This group is well marked, and I have half a dozen distinct species under review at the present time: these all agree in general appearance, in the spirally sculptured protoconch and the heavily varicosed somewhat oval aperture, though varying from minute slender elongate forms to large stout tightly wound forms. These have been classed in *Alvania* and *Alvinia*, but examination of the type of *Alvania* shows a very different style of shell. *Alvinia* recalls them, but species of that genus have a smooth protoconch, and are different in texture, resembling that of *Brookula*. A number of small shells with a smooth protoconch and a *Brookula* appearance also occur in Australian waters, but these when compared with *Alvinia* do not match at all, showing the great difficulty of judging "Rissoids" from descriptions or figures. I will elaborate this group later, as I know no Neozelanic species, though *Rissoa pingue* Webster, a species I am not autoptically acquainted with, may belong here.

A series of species show a spiral sculpture only, the above-named being all clathrately sculptured. These differ in other details, but the association hereafter mentioned does not seem natural. *Rissoa suteri* Hedley is the only Neozelanic example. This is classed by Suter in *Onoba*, but neither it nor the other species so classed by Suter, *R. foliata* Suter, have much in common with the type of *Onoba*. This species, *striata* Montagu, I have collected in Devonshire, England, and it accurately agrees conchologically with the shells named by Webster *R. candidissima* and *R. carnosa*. The confusion present in Suter's arrangement can be gauged from the fact that the former is placed in the genus *Rissoa* under the subgenus *Alvania*, whilst the latter appears in the genus *Rissoina* under the subgenus *Moerchiella*. Yet both are typically *Onoba*, not like the species *Onoba glomerosa* Hedley, somewhat atypical. *Ceratia* is invalidated by the prior *Cerantias*.

Otherwise the shells so classed by Suter agree fairly well. The group is well represented, and might be regarded as a subgenus of *Onoba*, and would include most of the species placed by Hedley in *Onoba*.

Cingula is utilized for a series of species which may not be congeneric, but they certainly differ generically from the type of *Cingula*, a shell I collected numerously in Devonshire, England. Hedley has classed these in *Amphithalamus*, but his association of species differs from mine.

Setia cannot be resorted to for the "featureless" Rissoids, as it is preoccupied. It has been subdivided many times by European malacologists, and I will discuss the names hereafter.

Amphithalamus is a name I have a great dislike to, as it was given to a North American species, and the austral species so called have an austral name already available.

Anabathron was proposed for an Australian species, and the group is confined to austral seas, as hereafter observed.

Haurakia gen. nov.

This genus-name is provided for the species agreeing with *Rissoa hamiltoni*, which I name as type. I introduce this genus with some diffidence, as the species is conchologically quite close to *Turboella* Gray. The mouth of the type species of that genus disagrees, and it runs into quite a different form, named *Zippora*, which again varies, and has been generically named *Rissostomia*. The variations that more strongly recall the austral group have been named *Apicularia* and *Pusillina*, both by Monterosato, whilst *Sabanaea* was used by Monterosato for another, to me indistinguishable, group.

Apicularia and *Pusillina* agree very closely, as far as conchological characters go, with *Haurakia*, but as they appear rather obvious derivatives of *Turboella*, which differs very appreciably from the Neozelanic forms, I would reject both.

Merelina gen. nov.

I propose this name for the shells grouped around *Rissoa cheilostoma* Ten.-Woods, which I name as type.

The New Zealand specimens available differ at sight from Sydney shells so named, and I have found species of this genus to be fairly constant in their characters. The genus extends to Lifu as *Alvania pisinna* Melvill and Standen, which I collected commonly at the Kermadecs, and is undoubtedly congeneric.

I doubtfully locate here Webster's *R. pingue*, as the "glossy" protoconch indicates it as a member of another group; but it is almost impossible to generically place any Rissoid without study of actual specimens.

I would reject *Alvania* without much consideration, and *Alvinia* superficially recalls this group, but the texture differentiates this form easily. I would draw attention to a paper by Bartsch in the Proc. U.S. Nat. Mus., vol. xli, p. 333 *et seq.*, 1911, on the west American species of *Alvania*. No authority is given for the generic name, nor is there any synonymy collated, nor are comparisons given with any extra-limital forms even as regards generic affinity, yet species with smooth nuclear whorls, punctured (papillose) nuclear whorls, and spirally lirated nuclear whorls are lumped together, whilst the shells show spiral sculpture only or clathrate or both, with varicose mouths or simple, oval or pear-shaped.

Alvania cosmia Bartsch, p. 352, pl. 31, fig. 4; *Alvania halia*, id., p. 354, pl. 31, fig. 5; and *Alvania aequisculpta* Keep, p. 358, pl. 32, fig. 7, seem to agree exactly from figures and descriptions with members of *Merelina* as here proposed, which, as far as Australasian waters are concerned, is a distinct well-marked group.

Subonoba gen. nov.

The species Suter classed under *Ceratia* are here so named, and I select *Rissoa fumata* as type. In addition to the three species included by Suter, other species are known to me from New Zealand. In general appearance these differ from *Onoba*, and they always entirely lack longitudinal ribs. The British species of *Onoba* sometimes show these very obscurely, but even then they are quickly recognizable.

Probably the shells classed by Hedley in *Onoba*—viz., *Onoba bassiana* (Zool. Res. Fish. Exp. "Endeavour," pt. i, p. 108, pl. xix, fig. 25, 1911) and *Onoba glomerata* (Proc. Linn. Soc. N.S.W., vol. xxxii, p. 495, pl. xvii, fig. 23, 1907)—together with Watson's *Rissoa (Onoba) mercurialis* (Chall. Rep. Zool., vol. xv, p. 600, pl. xlv, fig. 12, 1886) could be here placed, as, though the two former do not fairly agree in general shape and mouth characters, they disagree much more with typical *Onoba*.

Lironoba gen. nov.

I designate as type of this new group *Rissoa suteri* Hedley. These heavily lirately sculptured forms seem to be unknown in European seas, as I have noted nothing that much recalled this species.

When Hedley (Proc. Linn. Soc. N.S.W., vol. xxxiii, p. 469, 1908) described *Rissoa imbrex* (pl. x, fig. 33) he wrote, "This species is related to a small group of spirally ribbed shells—*R. tenisoni* Tate, *R. layardi* Petterd, *R. agnewi* Ten.-Woods, and *R. unilirata* Ten.-Woods—among which it stands nearest to the last." Since then he has added *Rissoa lockyeri* (Zool. Res. Fish. Exp. "Endeavour," pt. i, p. 103, pl. xviii, fig. 22, 1911) and *Alvania praetornatilis* (Rec. Austr. Mus., vol. viii, p. 139, pl. xli, fig. 16, 1912), and this series may be temporarily classed, for the sake of convenience, together under the genus-name *Lironoba*. I write "temporarily," as some recall other genera, and further study may necessitate their transposition.

Rissoa wilsonensis Gatliff and Gabriel, Proc. Roy. Soc. Vict., vol. xxv, n.s., p. 68, pl. viii, fig. 4, 1913, also comes into this genus.

Estea gen. nov.

The shell described by Webster as *Rissoa zosterophila* is selected as type of this genus, which is as yet quite an austral evolution. When Melvill and Standen met with a species from Lifu they were quite puzzled, and referred it to *Barleeia*, a quite inadequate conclusion. Hedley (Zool. Res. Fish. Exp. "Endeavour," pt. i, pp. 105-8, 1911) has referred them to *Amphithalamus*, but that generic name should be restricted to the species grouped around *Rissoa scrobiculata* Watson and *R. jacksoni* Brazier (= *badia* Watson). These superficially agree with *Amphithalamus inclusus* Carpenter, but the operculum of that species seems undescribed. Hedley has figured an operculum in the mouth of his *Scrobs pyramidatus* (Mem. Austr. Mus., iv, p. 354, fig. 77 in text, 1903), and this seems to agree with specimens I have examined: but I hope to deal fully with the genus *Amphithalamus* at a later date. I have many species all clearly showing the "*Scrobs*" feature, which never seems to me to merge into such a mouth as that shown by the type of *Estea*.

The difficulty of classing these is shown by the fact that the genus *Nodulus* Monterosato resembles a distorted *Scrobs*-like species, whilst the genus *Pisinna* Monterosato suggests a combination of *Scrobs* and *Estea*, agreeing exactly with neither. Yet when Sacco discovered a fossil like *Scrobs* he named it *Parvisetia? mioscrobooides* (I. Moll. del Piemonte, pt. xviii, p. 32, 1895).

Then Bartsch (Proc. U.S. Nat. Mus., vol. 41, pp. 289-91, 1911) described west American species of *Nodulus*, after having dealt with the species of *Amphithalamus* (id., pp. 263-65), and thereto assigned shells whose figures recall such as were assigned by Tate and May to *Rissopsis* and Hedley to *Epigrus*. The species Tate and May put under *Nodulus* Hedley has referred to *Amphithalamus*.

When Hedley transferred *Rissoa bicolor* Petterd to *Amphithalamus* (Zool. Res. Fish. Exp. "Endeavour," pt. i, p. 106, 1911) he noted, "This seems synonymous with *R. annulata* Hutton (N.Z. Journ. Sci., ii, July, 1884, p. 173; Proc. Mal. Soc., iii, 1898, p. 3) from New Zealand, over which it has priority." I do not understand how this erroneous statement was made, as Webster showed that at the second reference a very distinct species was described, and that Hutton's *R. annulata* was only a form of Hutton's *R. olivacea*, the type of Hutton's genus *Dardania*. The second species he named *R. zosterophila* (Trans. N.Z. Inst., vol. xxxvii, 1904, p. 277, pl. ix, fig. 5 (1905)), and this is the type of my *Estea*. *Rissoa bicolor* Petterd I refer to the same genus, but specimens (practically paratypes) of this species in the British Museum agreeing with figures by Tate and May, as quoted by Hedley and more recently figured by Gatliff and Gabriel (Proc. Roy. Soc. Viet., vol. xxv, n.s., pl. viii, figs. 5, 6, 1913), are abundantly distinct from Webster's species.

I should consider that Hedley and May's *Rissoa columnaria* (Rec. Austr. Mus., vol. vii, p. 117, pl. xxii, fig. 9, 1908) showed every character of *Estea* clearly both in figure and description: "Aperture perpendicular, circular, peristome reflected all round."

Webster figured the operculum of *R. zosterophila*, and this disagrees with that of *Scrobs pyramidatus* Hedley aforementioned.

I suggest the inclusion under *Estea* of all the species Suter placed in the subgenus *Cingula*, with which they have very little in common.

I have more New Zealand species of *Estea*, and also species from Lord Howe and Norfolk Islands, where *Amphithalamus* also occurs, but I only procured examples of the latter genus from the Kermadec Islands.

Notosetia gen. nov.

This is provided for the "*Setia*" of Suter, and I name as type *Barleeia neozelanica* Suter. I consider it a heterogeneous assemblage, but consider it wiser to provide quite a new name than encumber Neozelanic literature with another unnecessary extra-limital innovation. I have studied the European "*Setia*," and could easily match some of the shells with Neozelanic forms, but as each European species has one or more generic names it would be difficult to fix a limit, and some of the Neozelanic forms differ widely. Further, the particular forms that conchologically agree are known, in the few cases that animal or opercular features have been studied, to disagree. The "Gordian solution" I therefore favour, and solicit criticism. In a like case Thiele referred such things to "*Rissoa*," and upon my remonstrance urged, "I know quite well they are not *Rissoa*, but I don't know what they are."

Nozeba gen. nov.

I recorded as Recent the species *Rissoa emarginata* Hutton, previously known only in the fossil state. I now provide for this species the above genus-name, and fix it as type. A second species is *Rissoina couthardi* Webster. These two species are classed by Suter in *Rissoina* under the section *Zebina* H. and A. Adams.

The species of *Zebina* differ generically from those of *Rissoina*, which ever subgenus of the latter is compared. I collected a species of the true *Zebina* at the Kermadecs, and was at once struck by its peculiar Eulimoid aspect, and found later that some of the species had been described under the genus-name *Eulima*.

A recent consideration of the varied forms classed under *Rissoina* showed no other species easily compared with the two above named.

Dardanula gen. nov.

I propose this name to replace *Dardania* Hutton, 1882, which is pre-occupied by *Dardania* Stål. Suter has dismissed this as a synonym of *Eatoniella* Dall, which he has ranked as a subgenus of *Rissoina*. The reference to *Rissoina* simply because the operculum shows an internal clavi-form nucleus is a degradation of conchological characters, as the association of shells by means of operculum alone would lead to chaos. If the operculum of *Dardanula* be compared with that of *Rissoina* it will be seen to differ widely, whilst from shell characters the two would never be ranged together. Thiele has shown that the genus *Eatoniella* has been utilized to cover diverse elements, examination of the animal showing different generic types to be thereunder confused. The operculum of *Dardanula* differs at sight from that of *Eatoniella*, so that generic distinction must be allowed.

Anabathron foliatum (Suter, 1908). [P. 204.]

When this species was described by Suter he placed it in the genus *Rissoa*, while he referred another shell to *Anabathron*, describing it as *A. gradatum*. I cannot exactly place the latter species, but it is certainly not referable to *Anabathron*, whilst the former just as decidedly is.

The genus *Anabathron* is well defined, and seems to be as yet only known from east Australian and Neozelanic waters. The species comprising the genus at present are: *Anabathron contabulatum* Fraenfeld, New South

Wales: *A. contortum* Hedley, 1907, Queensland; *A. ascensum* Hedley, 1907, Queensland; *A. foliatum* (Suter, 1908), New Zealand; *A. pagodiformis* Sowerby, 1914, New Caledonia. I have a sixth species, from Lord Howe Island, at present undescribed.

Estea roseola nom. nov. [P. 209.]

This is proposed for the *Rissoa rosea* Hutton, 1873, which is invalidated by *Rissoa rosea* Deshayes, Île Réunion Moll. p. 61, pl. vii. fig. 29, 1862. The reference to the genus *Estea* is tentative, as the specimens before me, identified from their coloration as Hutton's species, incline rather to *Amphithalamus*, and might be better grouped there. I suggest that more than one species is classed under *Rissoa rosea* Hutton through the prejudice of the coloration.

Notosetia subflavescens nom. nov. [P. 212.]

Suter's selection of *Rissoa atomus* in 1908 was invalid, as Smith had previously proposed the same name (Proc. Zool. Soc. (Lond.)) for a St. Helena shell. I rename Suter's species as above, but the generic location must be considered a tentative one.

Rissoina chathamensis (Hutton, 1873). [P. 220.]

This name must be used for the species commonly known as *R. rugulosa* (Hutton, 1873). Both names were introduced in the same place, but the one I select has five pages precedence, and therefore demands recognition. Suter suggests that it is scarcely distinct from some Australian species, but says that he has not the series available to settle the question.

Suter has admitted *Rissoina hanleyi* Schwartz, 1860, and, though he writes the specimens are "undoubtedly" this species, the determination may be queried. No other extra-limital species of *Rissoina* is recorded from New Zealand, and the Philippines are a long way off. *R. hanleyi* does not appear (at present) to be a common shell in intermediate localities.

My arrangement of the New Zealand *Rissoidae* would then be expressed thus:—

Genus HAURAKIA nov.

Haurakia hamiltoni (Suter, 1898).

— *huttoni* (Suter, 1898).

— *exserta* (Suter, 1908).

Genus MERELINA nov.

Merelina cheilostoma Ten.-Woods, 1877. Synonyms: *Rissoa plicata* Hutton, 1873, not Deshayes, 1838; *R. cheilostoma* var. *lyalliana* Suter, 1898.

— (?) *pingue* Webster, 1905.

Genus ONOBA H. and A. Adams, 1852. *Onoba* H. and A. Adams, Ann. Mag. Nat. Hist., 2nd ser., vol. x, p. 358, Nov. 1. 1852. Type: *O. striata* (Montagu).

Onoba candidissima Webster, 1905.

— *carnea* Webster, 1905.

Genus SUBONOBA nov.

Subonoba foveauxiana (Suter, 1898).

— *firmata* (Suter, 1898).

— *insculpta* (Murdoch, 1905).

Genus LIRONOBA nov.

Lironoba suteri (Hedley, 1904).

Genus ANABATHRON Frauenfeld, 1867.

Anabathron foliatum (Suter, 1908).

Genus ESTEA nov.

Estea incidata (Frauenfeld, 1867).— *lampra* (Suter, 1908).— *roseola* nov.— *roseocincta* (Suter, 1908).— *subfusca* (Hutton, 1873).— — var. *micronema* (Suter, 1898).— *zosterophila* (Webster, 1905).— — var. *minor* (Suter, 1898).— *impressa* (Hutton, 1885).— *rufoapicata* (Suter, 1908).

Genus NOTOSETIA nov.

Notosetia subflavescens nov. Synonym: *Rissoa atomus* Suter, 1908, not Smith.— *infecta* (Suter, 1908).— *leptalea* (Murdoch, 1905).— *lubrica* (Suter, 1898).— *micans* (Webster, 1905).— *microstriata* (Murdoch, 1905).— *neozelanica* (Suter, 1898).— *porcellana* (Suter, 1908).— *stewartiana* (Suter, 1908).— *verecunda* (Suter, 1908).— *vulgaris* (Webster, 1905).— ? *gradatum* (Suter, 1908).

Genus AMPHITHALAMUS Carpenter, 1865.

Amphithalamus hedleyi (Suter, 1908).

Genus RISSOINA D'Orbigny, 1840.

Rissoina hanleyi Schwartz, 1860.— *rufolactea* Suter, 1908.— *chathamensis* (Hutton, 1873). Synonym: *Rissoa rugulosa* Hutton, 1873.— *zonata* Suter, 1909.

Genus NOZEBA nov.

Nozeba coulthardi (Webster, 1908).— *emarginata* (Hutton, 1885).Genus DARDANULA nov. Synonym: *Dardania* Hutton, Trans. N.Z. Inst., vol. xiv, p. 147 (1882), (not *Dardania* Stål).*Dardanula chiltoni* (Suter, 1909).— *cuvieriana* (Suter, 1908).— *fuscozona* (Suter, 1908).— *limbata* (Hutton, 1883).— *olivacea* (Hutton, 1882).— — var. *annulata* (Hutton, 1884).— — var. *lutea* (Suter, 1908).

Probably we do not know even a quarter of the number of species of the family *Rissoidae* existing in Neozelanic waters. Many of the species seem to be local on the littoral, and very little dredging has yet been done. A day's seaweed-washing at almost any point would give a new species, whilst

shell-sand would easily add others at the same place, such inhabiting the sublittoral zone. It is, however, more than probable that when the animals are examined many will be found to belong to other families, and it is imperative that the present association be only recognized as a temporary one.

Omalogyra bicarinata (Suter, 1908). [P. 229.]

I have before me specimens which agree in detail with Suter's description and figure. They cannot be referred to *Omalogyra*, as the "peristome continuous" is quite antagonistic to that genus. I have many times studied them, and they do not carry adult features in my eyes. My series does not exactly prove, but I myself am of the opinion, that they represent the first stage in the growth of *Turbo smaragdus* (Martyn, 1784). The careful search for young microscopic forms at any locality would well repay the student, and such a puzzle as the present one would be quickly solved. The shells can be compared with the juveniles of *Angaria*, which Suter described as species of *Liotia* (*ante*). I have examined, as well as the European and Neozelanic species of *Omalogyra*, species from Sydney, New South Wales, Lord Howe Island, and Norfolk Island, and they are all easily recognizable.

Genus *Cerithiella* (Verrill, 1882). [P. 249.]

In the Proc. Mal. Soc. (Lond.), vol. ix, p. 260, 1911, I discussed the rejection of this name by Cossmann, and the proposition of the new name *Newtoniella*. According to the nomenclatural laws now in force, *Cerithiella* is the valid name for this genus, and must be used. Thiele, apparently independently, has also investigated the matter, and has endorsed my conclusion. Morris and Lycett introduced *Ceritella*, and this name does not clash with *Cerithiella*, which was proposed by Verrill in the Trans. Conn. Acad., vol. v, p. 522, 1882. Mr. Edgar A. Smith, I.S.O., recently working upon Antarctic shells, has considered the matter, and also confirmed my results.

The only Neozelanic species seems referable to the genus as defined by Harris and quoted by Suter, but disagrees somewhat with the type.

Seila terebelloides (Hutton, 1873). [P. 253.]

Suter used *Cerithium terebelloides* Martens, Crit. List, 1873, p. 26, as the basis of his *Seila terebelloides*, rejecting *Cerithium cinctum* Hutton of even date, writing, "Hutton's name has priority by one month, but the description is quite inadequate, and he himself adopted the name bestowed on the species by von Martens." Hutton, however, published Martens' name at the same time as his own—viz., in the Cat. Mar. Moll. N.Z., p. 107, 1873—so that Hutton's *C. cinctum*, p. 27, has only page, not time, priority. This is quite sufficient to legalize Hutton's name; but we are relieved from making any alteration, as Hutton's name-selection was anticipated by Bruguière (Tabl. Ency. Meth. Vers., pt. 2, p. 493, 1792).

The original reference, however, must be quoted: *Cerithium (Bittium) terebelloides* Hutton, Cat. Mar. Moll. N.Z., p. 107, 1873.

Calyptraea tenuis (Gray, 1867). [P. 284.]

Mr. E. A. Smith has shown that *Calyptraea scutum* Lesson is indeterminate, and that the correct name for the Neozelanic shell is *C. tenuis* Gray, Proc. Linn. Soc., 1867, p. 735.

Calyptraea novaezelandiae (Lesson, 1830). [P. 285.]

Suter has rejected this name in favour of the later one given by Quoy and Gaimard because the latter figured their species. This is not a valid reason, and, as Lesson's description is recognizable, his prior name must be conserved, as Suter himself had concluded only a very few years before (Trans. N.Z. Inst., vol. xxxviii, p. 326).

Crepidula costata Sowerby, 1824. [P. 287.]

When rejecting *C. aculeata* (Gmelin), Suter remarked, "Sowerby's species was first figured (1824), and his specific name has to be adopted." This statement is due to ignorance of the facts, as when Gmelin named his species he quoted no fewer than five figures in support as having appeared prior to 1791. However, Sowerby's name should be retained, as *Patella aculeata* Gmelin has been shown by Mr. E. A. Smith to be a different species.

Polinices vitreus (Hutton, 1873). [P. 290.]

If the identity of Hutton's *Natica vitrea* and Watson's *N. amphiala* be admitted, Hutton's name must be used. It is apparently rejected on account of the lack of figure, which is no valid reason. Watson himself repudiated the identity until shells were compared, and I do not know whether this has yet been done.

Trichotropis inornata (Hutton, 1873). [P. 296.]

Suter has rejected this name in favour of Sowerby's later *T. clathrata*, as this was figured and Hutton's species was not. Hutton's species has always been recognized, and Suter's alteration seems here to create quite unnecessary confusion, as hitherto no question of the availability of Hutton's name had arisen to the New Zealand student. Suter has given as habitat, "Throughout New Zealand, in deep water." I have found this species living also between tide-marks on Otago Peninsula.

I would agree with Suter that this species seems much nearer *Trichotropis* than *Lippistes*, and all the Australian forms are really better placed in the latter than the former genus.

Fam. Cymatiidae Iredale. [P. 302.]

I have recently advocated the recognition of this family-name, as Dall's name *Septidae* I proved to be invalid. The reasons for the alteration can be here summarized: Dall and Simpson (Bull. U.S. Fish. Commission, vol. xx, pt. i, p. 416, 1900) brought into use for the shells congeneric with *Murca tritonis* Linné the name *Septa* of Perry, 1811. This was done as *Tritonium*, commonly in use, was invalid. Dall then contributed an invaluable account, entitled "An Historical and Systematic Review of the Frog Shells and Tritons" (Smithson Miscell. Coll., vol. xlvii, pp. 114 *et seq.*, 1904). As this is not generally available to the Neozelanic student, I give a synopsis, so that my remarks can be followed:—

Fam. SEPTIDAE Dall.Genus *Trachytriton* Meek.*Personella* Conrad.*Ranellina* Conrad.*Austrotriton* Cossmann, 1903.

Fam. SEPTIDAE—continued.

Genus *Gyrineum* Link, 1807.

Eugyrina Dall, nov.

Argobuccinum Mörch, 1852.

Subgenus *Paralagena* Dall, nov.

Fusitriton Cossmann, 1903.

Priene H. and A. Adams, 1858.

Distortrix Link, 1807.

Cymatium Bolten, 1798.

Subgenus *Cymatium* s. str.

Sect. *Cymatium* s. str.

Lampusia Schumacher, 1817.

Ranularia Schumacher, 1817.

Tritonocauda Dall, nov.

Gutturnium Mörch, 1852.

Turritriton Dall, nov.

Tritoniscus Dall, nov.

Cabestana Bolten, 1798.

Subgenus *Monoplex* Perry, 1811.

Linatella Gray, 1853.

Genus *Septa* Perry, 1811.

This was certainly an advance on Cossmann's treatment of the previous year in the *Essai Paléoconch. comp.*, vol. v, which was marred throughout by a disregard of the nomenclatural laws commonly observed. Kesteven had also attempted to show that all the species constituted a single genus (*Proc. Linn. Soc. N.S.W.*, vol. 27, pp. 443–83, 1902); but his effort was prejudiced by lack of material, and consequent inability to fix relationships from figures alone. I have already indicated that this group calls for a competent monographer, as Dall's review was of a skeletal nature, and it is difficult to reconcile the shells with the preceding synopsis. Cossmann (*Essai Paléoconch. comp.*, vol. vii, p. 232 *et seq.*, 1906) criticized Dall's classification, but his nomenclature does not agree with the facts, and his rejection of the Boltenian and Linkian genera obviates much discussion of his results.

As type of *Septa* Perry, 1811, Dall selected *Septa rubicunda* Perry = *nodiferum* Lamarck, 1822, and this was accepted, as there was no legal objection possible to Dall's action. Mathews and I have, however, showed that Perry, in an earlier work, named "Arcana" ("Victorian Naturalist," vol. xxix, 1912, pp. 9–11), had introduced the genus-name *Septa* in connection with the species *S. scarlatina* Perry = *Murex rubecula* Linné, 1758, alone. This species is not congeneric with *Septa rubicunda*, so that Dall's usage is invalidated. We observed that Pilsbry had cited *Septa* Perry, 1811, as a synonym of *Aquillus* Montfort, 1810; but as we now knew *Septa* to have been published on the 1st January, 1810, it should antedate Montfort's name, but that we did not know the date of publication of Montfort's work. I have since discovered that this was reviewed in the *Gotting. Anzeiger*, as follows: Vol. i, pt. 2, p. 961, 19th June, 1809; vol. ii, pt. 2, p. 847, 28th May, 1810. The latter date is the one concerned; but *Aquillus* Montfort, 1810, is an absolute synonym of *Cabestana* Bolten, 1798. For the *Tritonis* group, as *Septa* was unavailable, Dr. Dall ("Nautilus," vol. xxvi, pp. 58–59, Sept., 1912) suggested the use of *Nyctilochus* Gistel, 1848. However, upon looking into the matter I noted that this name was not applicable,

whilst another one proposed by Gistel—viz., *Charonia*—was. I therefore advocated the use of this genus-name ("Nautilus," vol. xxvii, p. 55, 1913), and also proposed that the family-name should be *Cymatiidae*, basing this upon the oldest generic name in the group, *Cymatium* Bolten, 1798.

From a criticism of the British Museum material I cannot advocate the recognition of all of Dall's groups, whilst the nomenclature must be amended.

Kesteven had suggested the abolition of all sectional grouping, and the reference of all the species to the genus-name *Lotorium* (= *Cymatium*), indicating that no marked groups were distinguishable. I do not agree with this statement, as there are certainly well-differentiated series, and Kesteven's connecting-links, in many cases, were due to a misunderstanding of the species so considered. I think that a mean between Dall's treatment and that of Kesteven would be an advancement; but much study must be given, as there can be no question that the group, from a taxonomic point of view, is a difficult one. Nevertheless, the association of such shells as *Murex labiosus* Wood and *Murex tritonis* Linné in the same genus seems inadequately to represent their relationship.

For the Neozelanic species I would consider the facts best shown by the scheme hereafter given. The British Museum collection has been arranged on Dall's plan, and I have simply amended it where it seems possible; but, as already stated, a competent monographer might alter my grouping, though I consider it shows the facts fairly well.

At the Kermadecs I obtained specimens of many species of this family and the family *Bursidae* which do not occur in Neozelanic waters as far as is yet known. The recent recognition of "*Cymatium parkinsonianum* Perry" suggests that some of these may yet be discovered in the extreme north of New Zealand.

My arrangement would read as follows:—

Fam. CYMATHIDÆ Iredale.

Genus *Charonia* Gistel, 1848.

Charonia lampas (Linné, 1758).

— *tritonis* (Linné, 1758).

Genus *Cymatium* Bolten, 1798.

Subgenus *Monoplex* Perry, 1811.

Cymatium parthenopeum (von Salis, 1793).

Subgenus *Cabestana* Bolten, 1798.

Cymatium exaratum (Reeve).

— *spengleri* (Perry, 1811).

Genus *Austrotriton* Cossmann, 1903.

Austrotriton parkinsonia (Perry, 1811).

Genus *Argobuccinum* Mörch, 1852.

Argobuccinum tumidum Dunker.

— *australasia* (Perry, 1811).

Charonia lampas (Linné, 1758). [P. 303.]

Mr. E. A. Smith, I.S.O., has recently investigated the status of *Murex lampas* Linné, Syst. Nat., ed. x. p. 748. 1758, from the Mediterranean Sea, and has shown (Journ. Conch., 1914) that it refers to the species *Triton nodifer* Lamarck, 1822. This name Suter has synonymized with *Septa rubicunda* Perry, 1811, which name, on the score of priority, is used. But Mr. Smith has also noted that *Tritonium opis* Bolten, Mus.

Bolten, 1798, p. 125, is the Mediterranean shell, and is also earlier than Perry's name. I cannot differentiate Australian, Kermadec, and Neozelanic specimens from Mediterranean examples, though I have been prejudiced in favour of that course by Hedley's decision (Biol. Res. "Endeavour," vol. ii, 1914, p. 65). In coloration, degree of nodosity, and size, austral specimens easily match northern shells, and I conclude variation is due to station of life, not locality. At the Kermadecs I found many examples living below low-tide mark which were all decollate, much eroded, and comparatively small; but specimens washed up from deeper water—probably 10 to 15 fathoms—were of much larger size, and quite clean. No difference whatever can be seen by me at present between these and northern shells. This would agree with Hedley's experience (loc. cit.), as I would regard his var. *euclia* (pp. 65-66) as a deep-water representative of the austral shell. The wrinkling on the columella and inner lip is a character which differs with age, younger specimens showing heavy wrinkling such as is seen in *tritonis* Linné, but this becomes obscured by a heavy callus with age. For Neozelanic and Australian shells I must therefore recommend the usage of *Charonia lampas* (Linné, 1758), and this conclusion necessitates the acceptance of *T. sauliae* Reeve as a synonym.

Cymatium parthenopeum (von Salis, 1793). [P. 305.]

Such is the name to be used for *Septa costata* (Born, 1778) given by Suter. *Murex costatus* Born, 1778, is preoccupied by *Murex costatus* Pennant, Brit. Zool., ed. 4, vol. iv, p. 108, 1777. The next recorded synonym is *Murex parthenopeus* von Salis, Reise Neapel., p. 370, 1793. According to Watson (Chall. Rep. Zool. vol. xv, p. 391, 1886), the reversion to this specific name should be welcomed. Suter has placed the species in the genus *Septa* under the subgenus *Lampusia* Schumacher, 1817. This is obviously an error. It must be classed in the genus *Cymatium* Bolten, 1798, and the subgeneric name is *Monoplex* Perry, "Conchology," pl. iii, 1811, this species being figured as fig. 3 under the name *Monoplex australasiae*, which was long ago selected as type of *Monoplex*. The name *Monoplex australasiae* should be added to the synonymy of the species.

Austrotriton parkinsonia (Perry, 1811). [P. 307.]

Austrotriton Cossmann, Essai Paléconch. comp., vol. v, p. 98, 1903, was proposed, with type the fossil *T. radialis* Tate, the species *abbotti* Ten-Woods and *cyphus* Tate being noted as congeneric. When Kesteven wrote up his study of the genus *Lotorum* (= Fam. *Cymatiidae* mihi) (Proc. Linn. Soc. N.S.W., 1902), he said (p. 484), "*L. parkinsonianum* is the recent representative of *L. radiale*, *abbotti*, &c. This group is more distinct than any I have studied." Ten years afterwards (ib., vol. xxxvii, 1912) he figured *abbotti* and *parkinsonianum*, as well as *torterostris* Tate, to show the close relationship.

The Recent species *parkinsonia* Perry stands quite alone when compared with other Recent species, so that I make use of the generic fossil name, basing its use upon Kesteven's studies.

Triton strangei (A. Adams and Angas, 1864). [P. 308.]

The reference "*T. strangei* Ad. & Ang., P.L.S., 1878, pl. 15, f. 16," must be eliminated from the synonymy of *C. spengleri*. Pritchard and Gatliff

seem to be the authors of this mistake, as the two species are very distinct, and at the place given Smith figured Adams and Angas's type which was described in the same journal twelve years previously (p. 35) from Moreton Bay, Queensland.

As a matter of fact, from examination of types, I confirmed (Proc. Mal. Soc. (Lond.), vol. ix, p. 73, 1910) Tryon's reference of Adams and Angas's species to *Murex labiosus* Wood, Index Test. Suppl., 1828, p. 15. pl. v, fig. 18. I collected specimens at the Kermadecs agreeing accurately with both the types named. As far as I know, the species has not yet been found in Neozelanic waters, but it probably lives there, and may have been overlooked as the juvenile of some other species.

Triton waterhousei (A. Adams and Angas, 1864). [P. 308.]

This name is also given by Suter as a synonym of *Cymatium spengleri*. I collected specimens at the Kermadec Islands which I immediately differentiated from typical *C. spengleri*, and these were named *C. waterhousei* A. Ad. & Ang. for me by Mr. Hedley at Sydney. Mr. C. J. Gabriel, of Melbourne, Victoria, showed me specimens which he contended were gradations between *C. waterhousei* and *C. spengleri*. As my own series was small, for this reason I did not record *C. waterhousei* from the Kermadec Islands.

I have since received further specimens, and criticism of these in conjunction with the type force the conclusion that this species is quite distinct from *C. spengleri*. Kesteven (Proc. Linn. Soc. N.S.W., 1902, p. 475) also concluded that the two species were distinct, and gave what seem very good differential characters. I do not think *waterhousei* has yet been observed in Neozelanic waters.

Argobuccinum tumidum (Dunker, 1862). [P. 309.]

Ranella tumida Dunker, Proc. Zool. Soc. (Lond.), 1862, p. 239, Suter has included in the synonymy of *Argobuccinum argus* Gmelin, of which he gives as the range "Tasmania, Australia . . . Cape Colony . . . Chile." The most casual examination of Cape Colony shells, which probably Suter has not examined, convinced me of their distinction, the Cape being the type locality of *argus* Gmelin. Hedley (Proc. Linn. Soc. N.S.W., vol. xxxviii, p. 297, 1913), after examining the British Museum collection, advocated the recognition of the Australia-Neozelanic form as a distinct species, a course I emphatically endorse. The name given above is Hedley's selection.

Argobuccinum australasia Perry is also represented in South Africa by a distinct species, which I have asked Mr. E. A. Smith, I.S.O., who is much interested in South African shells, to describe. It differs at sight in the coloration of the outer lip, the "*leucostoma*" having dark red-brown teeth.

Philippia (Gray, 1847). [P. 316.]

As a subgenus of *Architectonica* Bolten, 1798, this name appears with the reference "*Philippia* Gray in Philippi Enum. Moll. Siciliae, i, 174; P.Z.S., 1847, 146. Type: *Solarium luteum* Lam." Here again I cannot guess who is responsible for such a confusion of facts.

In the Proc. Zool. Soc. (Lond.), 1847, p. 146, Gray has written, "*Philippia* Gray, 1840 (Phil. Sicil., i, 174). *Solarium luteum* Lamk." Reference to Philippi's work shows that vol. i was published in 1836, not

1840 as quoted in Suter's work, and that at the page given (174) Philippi simply described *Solarium luteum* Lamarck. He there gave observations on the animal, stating it was apparently normally Trochine, and had a Trochoid operculum. I have already recorded that *Philippia* does not appear in any of Gray's writings, as far as I could trace, until 1847 (Proc. Mal. Soc., vol. x, p. 309, 1913).

Genus *Omalaxis* (Deshayes, 1830). [P. 318.]

Suter's matter in connection with this genus-name is copied from Dall. As long ago as March, 1911, I had, however, published the results of an investigation into the status of this name, and it shows how slow the publication of the work must have been when no consideration of that article was able to be incorporated by Suter. I there showed that the type of *Omalaxis* was not *Solarium bifrons* Lam., as quoted by Suter, but *Solarium disjunctum* Lamarck, conchologically a different shell. I stated that study of growth-stages of shells collected at the Kermadecs had shown such a shell as that described by Murdoch and Suter as *Omalaxis amoena* to become adult as *Heliacus*, and that this species should be there transferred. I have since received many more examples, and hope to give figures later. The genus-name *Omalaxis* must be eliminated.

Fam. Pyramidellidae Gray. [P. 327.]

Though not mentioned, it seems obvious that Suter's classification of this family is based upon Dall and Bartsch's monograph.

In the "Nautilus," vol. xxiv, pp. 52-58, 1910, I made some comments on the nomenclatural defects apparent in this monograph, indicating the grave danger of the inaccuracies being continually copied by workers who were unable, through want of literature, to check their references. I stated that I was at that time unable to criticize the arrangement and grouping of the species and genera. I have not yet completed my studies, but cannot recommend the acceptance of Dall and Bartsch's groups. Suter appears to have done so, and Hedley did at one time, but only for a very short time.

Genus *Eulimella* (Jeffreys, 1847). [P. 329.]

In my paper quoted I showed that the reference given by Dall and Bartsch, and copied by Suter, was wrong, and that the earliest introduction of the genus-name *Eulimella* was by Jeffreys in the Ann. Mag. Nat. Hist.

I cannot recognize *Eulimella* as a subgenus of *Pyramidella*, the formation of the mouth being a clear separative feature, whilst geographically the group has a wider range than *Pyramidella*.

Genus *Syrnola* (A. Adams, 1862). [P. 330.]

This group also deserves generic recognition, as it is well marked and easily defined. Moreover, it is a large group with a great range, and, if only for convenience' sake, would claim usage.

Genus *Odostomia* (Fleming, 1813). [P. 333.]

Suter has here accepted the incongruous association considered a genus by Dall and Bartsch. This method of accepting a huge unwieldy group with a multitude of sections, many of which seem unnecessary, does not

appeal to me. A large number of well-defined groups, considered as genera, makes a much more workable system, and that is all that can be asked for at present in connection with these minutiae. As far as I have gone, I have found little difficulty in recognizing at sight species of *Oscilla*, *Pyrgulina*, *Miralda*, and *Odostomella*, simply to cite the first names called to mind. Such an ultra-conservative worker as Melvill (Proc. Mal. Soc. (Lond.), vol. ix, p. 171, 1910) rebelled at Dall and Bartsch's retrogressive action, and I would consider the arrangement given by Melvill a better and more natural one than Dall and Bartsch's.

On p. 197 Melvill notes that Dall and Bartsch failed to distinguish between *Turbonilla* and *Odostomia* (sensu lato), a fact I had independently observed. Again, on p. 194 Melvill points out that *Cingulina* and *Oscilla*, which Dall and Bartsch confused, were easily separable, another item I independently recorded.

I have not yet carefully criticized all the Neozelanic forms, but would advocate the acceptance of the subgenera quoted by Suter as of generic value.

For this family the names would then read,—

Genus EULIMELLA Jeffreys, 1847.

Eulimella coena Webster, 1905.

— *levilirata* Murdoch and Suter, 1906.

— *limbata* (Suter, 1908).

Genus SYRNOLA A. Adams, 1862.

Syrnola lurida (Suter, 1908).

— *pulchra* Brazier, 1877.

— *tenuiplicata* (Murdoch and Suter, 1906).

Genus TURBONILLA Risso, 1826.

Turbonilla zealandica (Hutton, 1873).

Genus ODOSTOMIA Fleming, 1813.

Odostomia acutangula Suter, 1908.

— *bembix* Suter, 1908.

— *cryptodon* Suter, 1908.

— *densilirata* Suter, 1908.

— *dolichostoma* Suter, 1908.

— *hyphala* Watson, 1886.

— *fastigiata* Suter, 1907.

— *incidata* Suter, 1908.

— *inornata* Suter, 1908.

— *stygia* Suter, 1913.

— *murdochi* Suter, 1913.

— *pudica* Suter, 1908.

— *takapunaensis* Suter, 1908.

— *taumakiensis* Suter, 1908.

— *vestalis* Murdoch, 1905.

Genus EVALEA A. Adams, 1860.

Evalea chordata (Suter, 1908).

— *impolita* (Hutton, 1873).

— *liricineta* (Suter, 1908).

Genus PYRGULINA A. Adams, 1863.

Pyrgulina rugata (Hutton, 1886).

Genus MENESTHO Möller, 1842.

Menestho sabulosa (Suter, 1908).

Genus *Subularia* (Monterosato, 1884). [P. 351.]

I have been unable to appreciate the subjection of the species commonly called *Leiostraca* to *Eulima*. I have already pointed out that *Leiostraca* is quite untenable, and that it must be displaced by *Subularia*. In the same place (Proc. Zool. Soc. (Lond.), 1914, p. 673) I noted that *Eulima*, 1826, was antedated by *Melanella*, 1822, and it was only by the acceptance of the generic separation of the "humpbacked" species under *Melanella* that *Eulima* could be preserved as commonly used. The worker who would lump *Subularia* with *Eulima* must needs use *Melanella* for the association, as the latter two are much more closely related than the former two. I would, at present, deny a very close relationship between the species of *Subularia* and those of *Eulima*. I have many species and forms of both under consideration at the present time.

Fam. Turbinellidae Sowerby, and Genus *Megalatractus* P. Fischer, 1884. [P. 355.]

These names and the matter relating thereto must be dismissed from the New Zealand molluscan fauna. They were introduced in order that *Siphonalia maxima* Tryon should be there placed, as, according to the investigations of Kesteven (Mem. Austr. Mus., iv, pp. 419-50, 1904), this species was congeneric with *Megalatractus aruanus* (Linné). Kesteven was unacquainted with the anatomy of the Neozelanic shells attributed to "*Siphonalia*," and consequently no comparisons were made in that direction. Minimizing the differences and magnifying the resemblances observed in the animals of the two species he examined, Kesteven concluded that they were congeneric. From a criticism of his work it becomes obvious that Kesteven confused group characters of a much higher value, and that the differences noted were of generic value. The natural sequence of accepting Kesteven's results would be the transference of all the Neozelanic "*Siphonalia*" to the genus *Megalatractus*. If the figures given by Kesteven of the operculum and radula of *Siphonalia maxima* be contrasted with those given by Hutton (Trans. N.Z. Inst., vol. xv, p. 119, pl. xiii, fig. F) for "*S.*" *dilatata* (Quoy and Gaimard), they will be seen to agree in the very details wherein they differ from Kesteven's own figures of the same items of *M. aruanus* (Linné). Kesteven also argued that the protoconchs of *S. maxima* Tryon and *M. aruanus* (Linné) were essentially similar. I entirely disagree with this conclusion, and would consider they showed radical differences. Here again the protoconchs of *S. dilatata* (Q. & G.) and *S. mandarina* (Duclos) are in absolute agreement with those of *S. maxima* Tryon. It will also be noted that Kesteven made no comparisons with true *Siphonalia*, and, consequently, whatever his results, they were prejudiced through overlooking this important item. The results were: *S. maxima* Tryon, *S. mandarina* (Duclos), and *S. dilatata* (Q. & G.) were much more closely related to each other than to *M. aruanus* (Linné), and were not congeneric. If it were admitted that these were congeneric, then Kesteven had not shown any reason for their transference from *Siphonalia*. I had got so far in 1907, and was hoping I might find *M. aruanus* at the Kermadec Islands, but I did not do so.

Upon further investigation at the British Museum I found that *Siphonalia* was introduced for a series of Japanese shells which were quite unlike those referred to this genus-name by Neozelanic and Australian students. The further discussion will be carried on under the name *Verconella*, which

must displace *Siphonalia* on p. 368. Here only must be noted that *Megalatractus* as a member of the family *Turbinellidae* is not a constituent of the Neozelanic fauna.

Genus *Taron* (Hutton, 1883). [P. 358.]

It was quite unnecessary to reduce Hutton's generic name to a synonym of *Latirus*, and thus also dispose of Hutton's specific name as invalid. *Taron dubius* Hutton, 1883, should be resumed for the species Suter includes as *Latirus huttoni*. Even if the relationship of the species with *Latirus* be admitted, the shell is sufficiently characterized for the genus *Taron* to stand on its own merits. In the British Museum it has two different locations, but neither approach *Latirus*, though as that genus is now shown it is obviously polyphyletic, and segregation is demanded, not the additional congregation of distinctive forms.

Reference to Mr. E. A. Smith, I.S.O., confirmed my conclusion, and he stated he could see little or no relationship with *Latirus*, and Melvill's generic groups are noteworthy for their polymorphic aggregations and are not natural.

Mitra carbonaria (Swainson, 1822). [P. 361.]

Hedley (Proc. Linn. Soc. N.S.W., vol. xxxviii, p. 312, 1913) has added "*Mitra badia* Reeve, Conch. Icon., ii, f. 157. Hab. ? M.C.," from examination of the type, to the synonymy of this species. Suter's remarks as to the occurrence of this species in New Zealand read, "Only worn and empty shells have hitherto been found. The type is from Port Jackson, New South Wales." The specimens I obtained at the Kermadecs were in the same condition, but they fairly well agree with specimens I collected at Port Jackson. I, however, note that, preserved in the British Museum, there are some shells named "*Mitra rutila* A. Ad., New Zealand." It is quite probable that this locality is wrong, but these shells have a superficial resemblance to *Mitra carbonaria* Swainson.

Genus *Verconella* Iredale. [P. 368.]

Siphonalia is admitted by Suter, three subgenera being recognized—*Siphonalia* s. str., *Penion*, and *Austrofuscus*. The typical Japanese species have no close relationship with the Neozelanic species so called, and the genus-name *Siphonalia* must be dropped from the Neozelanic list. The former recall *Cominella*, next to which they are placed in the British Museum, whilst the Neozelanic shells are not associated with them, but placed next to *Fusus* (sensu lato). I advocated in the Proc. Mal. Soc. (Lond.), vol. x, p. 223, 1912, the rejection of *Siphonalia* and the acceptance of *Penion* for the Austro-Neozelanic group, there also stating that *Siphonalia maxima* Tryon must accompany *S. dilatata* (Quoy and Gaimard), and be removed from the genus *Megalatractus*, where Kesteven had placed it through ignorance of the essential differential features of the animals.

Hedley (Biol. Res. "Endeavour," vol. ii, pt. 2, p. 73, 1914) has endorsed my suggestion, recording *Penion maximus* (Tryon) and *P. waiti* (Hedley). Previously Dr. Verco (Trans. Roy. Soc., South Austr., vol. xxxvi, p. 221, 1912 (1913)) had lumped *Siphonalia maxima* Tryon with *S. dilatata* "Quoy and Gaimard." This confirms my conclusion of the very close alliance of these two, as I considered them only congeneric, while Dr. Verco has reduced this grade by making them conspecific.

I have since observed that *Penion* Fischer is invalid, as Philippi had previously used it, and therefore introduced (Proc. Mal. Soc. (Lond.), vol. xi, p. 175, 1914) *Verconella*, with *Fusus dilatatus* Quoy and Gaimard as type. *Anstrofus* Kobelt cannot be used, as the type of that section is quite another style of shell. It looks similar to "*S.*" *mandarina* (Duclos), but examination of the shells shows them to differ considerably, and the resemblance to be similar. I cannot, however, separate "*S.*" *mandarina* Duclos subgenerically from *S. dilatata* (Q. & G.): they agree in every essential detail to me. Martyn's *Buccinum nodosum* is, however, a very different type of shell, and it may later prove generically distinct; in the meanwhile I propose the subgenus-name *Aethocola* for it alone.

My reading of the genus would be,—

Genus VERCONELLA Iredale, 1914. *Verconella* Iredale, Proc. Mal. Soc. (Lond.), vol. xi, p. 175, 1914. Type: *Fusus dilatatus* Quoy and Gaimard. Synonym: *Penion* Fischer. Man. de Conch., p. 625, 1884 (not *Penium* Philippi, Verh. z. l. Ges. Wien. vol. xv, p. 741, 1865).

Subgenus *Verconella* s. str.

Verconella dilatata (Quoy and Gaimard, 1833).

— *maxima* (Tryon, 1881).

— *mandarina* (Duclos, 1831).

— *raledicta* (Watson, 1886).

— *caudata* (Quoy and Gaimard, 1833).

Subgenus *Aethocola* nov.

Verconella nodosa (Martyn, 1784).

Cominella eburnea (Reeve). [P. 383.]

This name, according to Suter's synonymy, must displace *Cominella costata* (Quoy and Gaimard), as the basis of that name is *Buccinum costatum*, which is invalidated by the prior usage of Linné (Syst. Nat., ed. x, p. 738, 1758).

Cominella quoyana (A. Adams, 1855). [P. 384.]

Kobelt proposed *Cominella huttoni* for the species so named, as there was a *Buccinum quoyi* Kiener which comes into the same genus, *Cominella*. It has been continually used, but, according to the nomenclatural laws now adhered to, A. Adams's name must be reverted to.

Cominella adspersa (Bruguière, 1789). [P. 385.]

Martyn's *Buccinum maculatum* is invalidated by Linné's prior use (Syst. Nat., ed. x, 1758, p. 741). Bruguière's name comes next, and claims usage.

Fam. Fusidae Iredale. [P. 392.]

I propose this name to replace Dall's family *Colubrariidae*, basing the name upon the oldest genus-name in the family. The following account will clearly show the extreme difficulty and amount of time necessary if one attempts to name a shell correctly both generically and specifically.

When I was investigating the relationships of my genus *Jeannea* (Proc. Mal. Soc. (Lond.), vol. x, p. 220, 1912) it was necessary to fix the genus *Pisania*. The only member I was familiar with was *Pisania reticulata* A. Adams, and my *Jeannea* was nothing like that. Under the genus *Pisania* in the British Museum collection rather an incongruous association of shells appeared, amongst them being *Pisania reticulata*. The type of *Pisania*

of H. Bivona-Bernardi (Effem. Sci. Litt., vol. ii, p. 8, 1832) is *P. striatula* nov. = *B. maculosum* Gmel. That shell was as unlike *Pisania reticulata* as it was dissimilar from my *Jeannea*. It was obvious that Adams's species was unhappily located. Mr. C. Hedley was at that time in England, working through the Australian shells in the British Museum, so I drew his attention to this fact. He at once informed me that he had always been dubious of the generic selection, and that to his eyes *reticulata* suggested *Colubraria*. Upon making comparisons I at once agreed that such would be quite an acceptable relationship, and, moreover, noted that Mr. Edgar Smith had arranged some Australian shells in this genus. Thus *Colubraria bednalli* (Brazier), *C. coxi* (Brazier), and *C. angasi* (Brazier) are all closely related to *Pisania reticulata* A. Adams, the first-named being very near. My own specimens of *P. reticulata* A. Adams show obsolete varices, and the reticulate sculpture is characteristic of *Colubraria* and foreign to *Pisania*.

In the Smith. Miscell. Coll., vol. xlvii, 1904, Dall proposed the family *Colubrariidae* to cover a series of shells varied and showing a resemblance to Tritons, but differing in being rhachiglossate, not taenioglossate. As a subgenus of *Colubraria* was ranked *Cumia* Bivona, 1838, with type *Triton reticulatus* Blainville, and as sections were named *Maculotriton*, *Monostiodum*, *Caducifer*, and *Taeniola*, and a subgenus *Phrygiomurex*. The Australian species fall into *Cumia*, *angasi* being near *reticulatus* Blainville. As a consequence of this conclusion, *Pisania reticulata* must be renamed. However, in the Journ. Conch., vol. xi, p. 289 *et seq.*, 1906, Dall discussed "The Early History of the Generic Name *Fusus*," pointing out that this name was first proposed by Helbling in the Abhandl. Privat Böhm, vol. iv, pp. 116-20, 1779, and that four species were included, the last named being *Murex (Fusus) intertextus* Helbling = *T. reticulatus* Blainville. As causing the least confusion, this was selected as type of *Fusus* Helbling, and this antedates *Cumia* and also *Colubraria*. Dall suggests that these two may prove generically separable, and then *Colubraria* may be preserved for the larger shells. This, however, does not much concern us, as the shell under question is closely related to *Cumia* and not *Colubraria*. The specific name *reticulata* A. Adams cannot, however, be preserved, so that I propose the new name *Fusus mestayerae* for *Pisania reticulata* A. Adams.

The other three names I noted—*bednalli*, *coxi*, and *angasi*—all of Brazier, may need emendation when transferred to *Fusus*, though I have noted that Hedley has ranked the last two, I believe, as synonyms of *antiquatus* Hinds.

Genus *Pollia* (Sowerby, 1834). [P. 393.]

Suter has retained the genus *Cantharus* Bolten, 1798, for two Neozelanic species, citing as a synonym "*Pollia* Gray, 1839 (in part)." One of the species is placed under *Cantharus* s. str.; the other under *Tritonidea* Swainson, 1840, treated as a subgenus. It seems certain that Suter was not acquainted with *C. tranquebaricus* (Gmel.), otherwise he would not have separated *C. fuscozonatus* Suter from *C. colensoi* Suter to have placed it with that species. Most workers now admit "*Tritonidea*" as a distinct genus, and it is quite impossible to admit subgeneric distinction between the two Neozelanic species. Both would fall into "*Tritonidea*" in preference to *Cantharus*, and I would there place them. The name *Tritonidea* is, however, antedated by *Pollia* Sowerby, and use of the latter must be advocated. I showed (Proc. Mal. Soc. (Lond.), vol. x, p. 221, 1912) that *Pollia* was introduced in Sowerby's Gen. Rec. Fossil Shells, vol. ii, pl. 237, fig. 12, 1834, and that the type (the only species) there mentioned was

Triton undosus Lam. Consequently *Tritonidea* Swainson was six years later, and an absolute synonym. Later (Proc. Mal. Soc. (Lond.), vol. xi, p. 177, 1914) I noted that Swainson had recorded this identity, but preserved his own name on account of a prior *Polia*. But these two names are essentially different. Therefore I should dismiss *Cantharus* from the Neozelanic fauna and replace it by—

Genus POLLIA Sowerby, 1834. *Pollia* Sowerby, Gen. Rec. Fossil Shells, vol. ii, pl. 237, fig. 12, 1834. Type: *Buccinum nodosum*.
Synonym: *Tritonidea* Swainson, Treat. Mal., pp. 74, 302, 1840; same type.

Pollia fuscozonata (Suter, 1908).

— *colensoi* (Suter, 1908).

Alectrion victorianus nom. nov. [P. 397.]

I propose this name for *Buccinum fasciatum* Lamarck, 1822, which is antedated by *Buccinum fasciatum* O. F. Müller (Vermes, vol. ii, p. 145, 1774), and also by Bruguière (Ency. Meth. Vers., vol. i, p. 247, 1789). I have not seen Neozelanic specimens, and therefore note that the name is given to the Australian shell. I believe this shell is the badge of the Field Naturalists' Club of Victoria, and for this reason have formed the above specific name.

In the Man. Conch., vol. iv, as noted by Suter, this species was placed in the subgenus *Hima*. That name I will later show to be unapplicable, but cannot go into details at present; the subject is too complex. This species does not fall into *Alectrion* s. str., but, associated with *A. ephammilla* Watson, would fall into the subgenus which has wrongly borne the name of *Hima*.

Alectrion suturalis Lamarck subsp. *dunkeri* (Suter, 1908). [P. 398.]

I cannot understand what Suter has done in this case. Apparently he has renamed Dunker's *Nassa intermedia*, but I cannot understand what the shells were that he identified with this form.

At the Kermadecs I rarely collected a shell which occurs abundantly at Lord Howe Island, at Norfolk Island, and rarely in New South Wales. These were recognized by comparison with the types as *Nassa spirata* A. Adams. I recorded this in the Proc. Mal. Soc. (Lond.), vol. ix, p. 77, 1910. Suter's description and habitat agree with these shells, save for the statements, "Usually 3 distant fine brown spiral lines on the spire-whorls, 5 to 7 on the body-whorl." "Outer lip . . . sometimes with 4 to 5 minute teeth near the base." These are characteristics of the "*glans*" group, and do not occur in the hundreds of *A. spiratus* A. Ad. I have before me. Otherwise I should have considered Suter's name as a synonym.

Fam. Muricidae Fleming. [P. 399.]

The nomenclature of the species recognized in this family may be correct, but it is certain that the nomination of higher groupings is inexact.

Under the genus-name *Murex* Linné many groups are confused, and the characters of each are so well defined that they should be considered as of generic value. In the British Museum, an institution famed for its conservatism, this has been accepted, and the species are arranged under many genera. It is quite impossible for me at the present time to revise the group, but I would put on record some of the data I have collated, as it differs from that shown by Suter.

The earliest type-designation of the Linnean *Murex* I have traced is that by Montfort, who in the *Conch. Syst.*, vol. ii, p. 619, 1810, designated *Murex tribulus* Linné as type.

As subgenus (p. 400) *Muricantha* is used, based on *Muricanthus* Swainson, *Treat. Mal.*, 1840, p. 296; as synonyms being quoted *Centronotus* Swainson, 1835 (not of Schneider, 1801), and *Phyllonotus* Swainson, 1840.

On p. 403, as a subgenus, *Pteropurpura* Jousseaume, 1879, is used; as a synonym *Pteronotus* Swainson, 1840, not of Gray, 1838, being cited.

The history of the Swainsonian genera is as follows:—In the *Zool. Illus.*, 2nd ser., vol. iii, 1832–33, Swainson moved thus: In part 22, in connection with plate 100, he subdivided the genus *Murex* into five subgenera—viz., *Murex* Auct., *Haustellaria* Sw., *Phyllonotus* Sw., *Centronotus* Sw., and *Pterynotus* Sw. Diagnoses are given, but no species named. The species in question, however, is figured and described as *Murex* (*Centronotus*) *eury-stomus*. In part 24, on pl. 109, is figured and described *Murex* (*Phyllonotus*) *imperialis*, and *Murex pinnatus* is named in connection with *Pterynotus*. In the 27th part *Murex* (*Pteronotus*) *pinnatus* is figured on pl. 122, earlier described in Bligh's *Cat. App.*, p. 17.

The dates and types of these generic names would read then,—

Centronotus Swainson, *Zool. Illus.*, 2nd ser., vol. iii, pl. 100, 1833. Type (by monotypy): *Murex* (*C.*) *eury-stomus*, Sw.

Phyllonotus. id. ib., pl. 109, 1833. Type (by monotypy): *Murex* (*P.*) *imperialis* Sw.

Pteronotus, id. ib., pl. 122, 1833. Type (by monotypy): *Murex pin-natus* Sw.

In the *Treatise Mal.*, 1840, Swainson made several alterations, and this contradictory effort has been generally accepted without criticism, due to ease of reference. On p. 296 *Phyllonotus* Sw. is made to include both *eury-stomus* Sw. and *imperialis* Sw., whilst the new name *Muricanthus* is proposed, with two species—*radix* Sw. and *melanomathus*—though it is stated in a footnote, "This type was originally called *Centronotus*; but as that name had been previously given to a genus of fishes, we substitute the above." If Suter's synonymy were correct, then *Phyllonotus* Swainson, 1833, would replace the subgeneric name *Muricantha* Swainson, 1840, on p. 400; and on p. 403 *Pteronotus* Swainson, 1833, would become available instead of *Pteropurpura* Jousseaume, 1879, as it is earlier than *Pteronotus* Gray, 1838. As noted, however, above, these groups seem certainly very well differentiated, and of full generic value. A careful monographic review would probably give many more than I here admit, but there are four distinct groups. Fischer admitted seven subgenera covering these same four. Adams Bros. had recognized ten, but three of these were generically separated from *Murex* by Fischer.

Names not taken into consideration by Fischer are now commonly recognized, so that his nomination cannot be followed.

T. Martyn, in 1784, introduced *Purpura* for a species of this family, but its first entrance is in connection with a shell (*P. foliata*) which was later made the type of a new genus, *Cerastoma* Conrad, 1865, which name it must displace.

Perry's names *Triplex* and *Hexaplex* call for consideration, so that I have roughed out these names for future workers.

Montfort, in May, 1810, split up *Murex* Linné as follows: *Murex* Linné; type, *M. tribulus* Linné. *Chicoreus* nov., pp. 610–11; type, *M. ramosus*; *Brontes* nov., pp. 622–23; type, *M. haustellum*.

Perry, in June, 1810, independently provided: *Triplex*; type, *T. foliatus*; in December, 1810. *Aranea*; type, *A. gracilis*; and in 1811 *Hexaplex*; type, *H. foliacea*: the last-named being noted in June, 1810, as a *nomen nudum* only.

Of the above names, *Brontes* and *Aranea* cannot be legitimately used, as both are preoccupied.

Swainson, as above recorded, seems to have been the next, recognizing five subgenera, ignoring previous workers, and therefore introducing five new names, thus: *Murex* Auct., *Haustellaria*, *Centronotus*, *Phyllonotus*, and *Pteronotus*. The fifth, *Pteronotus*, seems to have not been previously indicated, and is a valid group. In 1840 Swainson added as distinct genera *Muricidea* and *Vitulina*. These are proposed in the Treat. Mal., p. 64, where the types are named as of the latter, the *Murex vitulinus* of authors and of *Muricidea* p. 65 *Murex magellanicus*. On p. 296 *Muricidea* has seven species noted, whilst on p. 297 *Vitularia* is written. I note this as the latter spelling is commonly used for a distinct group, whilst *Muricidea* was used for a subgenus of *Murex* by H. and A. Adams, though the type-designation of Swainson himself makes it an absolute synonym of *Trophon* Montfort, 1810.

The four outstanding genera would seem to bear the following names:—

Murex Linné, Syst. Nat., ed. x, p. 746. 1758. Type: *Murex tribulus* Linné.

Chicoreus Montfort, Conch. Syst., vol. ii, pp. 610–11, 1810. Type: *Murex ramosus* Linné.

Pteronotus Swainson, Zool. Illustr., 2nd ser., vol. iii, 1832–33, pl. 122. Type: *Murex pinnatus* Swainson.

Hexaplex Perry, Conchology, pl. viii, 1811. Type: *H. foliacea*, fig. 4 = *cichoreus* Gmel.

As early synonyms of *Murex* Linné, may be noted *Aranea* Perry, 1810, preoccupied; *Brontes* Montfort, 1810, preoccupied; *Haustellaria* Swainson, 1833; and *Haustellum* H. and A. Adams (ex Klein): and probably many more.

I do not see any more than subgeneric difference in the group typified by *Murex haustellum* Linné, though this was separated generically by Montfort in 1810, and has been given equal rank ever since with the divisions I call genera as above.

Jousseau, in the Rev. Mag. Zool., 3rd ser., vol. vii, 1879, p. 314 *et seq.*, divided the *Purpuridae* (= *Muricidae*) into very many genera. I give the names here, as they have not been recorded in Waterhouse's "Index Zoologicus" until given in No. ii, where they are given as appearing in "Les Naturalistes." 1883. Jousseau's names read as follows:—

P. 32: *Purpura* Tournefort. Type: *brandaris* L.

Haustellum Klein. Type: *haustellum* L.

P. 323: *Tubicauda* nov. Type: *brevispina* L.

P. 324: *Aeupurpura* nov. (ex Bayle MS.). Type: *tenispina* Lam.

Siratus nov. Type: *sirat* Adamson.

P. 325: *Paziella* nov. Type: *pazi* Crosse.

Poirieria nov. Type: *zelandicus* Q. & G.

Biplex Perry. Type: *perca* Perry.

P. 326: *Naquetia* nov. Type: *triqueter* Born.

Inermicosta nov. Type: *fasciata* Sow.

Muricanthus Swains. Type: *radix* Gmel.

- P. 327: *Homalocantha* Mörch. Type: *scorpio* L.
Favartia nov. Type: *breviculus* Sow.
- P. 328: *Muricidea* Swains. Type: *hexagonus* L.
Hexaplex Perry. Type: *cichoreus* Gmel.
- P. 329: *Bassia* nov. (ex Bayle MS.). Type: *stainforthii* Reeve.
Phyllonotus Swains. Type: *imperialis* L.
- P. 330: *Euphyllon* nov. Type: *monodon* Sow.
Chicoreus Montf. Type: *ramosus* L.
- P. 331: *Ocinebrellus* nov. Type: *eurypteron* Reeve.
Tritonalia Flem. Type: *crinaceus* L.
Gracillipurpura nov. Type: *strigosus* L.
- P. 332: *Lyropurpura* nov. (ex Bayle MS.). Type: *crassicostata*
 Desh. (foss.).
Ocinebrina nov. Type: *corallinus* Sacchi.
Hanetia nov. Type: *haneti* Petit.
- P. 333: *Pseudomurex* Monts. Type: *bactreatus* Brocchi.
Heteropurpura nov. (ex Bayle MS.). Type: *polymorphus*
 Bron. (foss.).
Vitularia Swains. Type: *vitulinus* Lam.
Crassilabrum nov. Type: *crassilabrum* Gray.
- P. 334: *Forreria* nov. Type: *belcheri* Hinds.
Jatova nov. Type: *jatou* Adamson.
Pteropurpura nov. Type: *macropteron* Desh.
Cerastoma Conrad. Type: *nutallii* Conr.
- P. 335: *Pterochelus* nov. Type: *acanthopterus* Lam.
Marchia nov. Type: *clavus* Kien.
- P. 336: *Pteronotus* nov. Type: *pinnatus* Wood.
Purpurellus nov. Type: *gambiensis* Reeve.
Poropteron nov. Type: *uncinarius* Lam.

Then followed a subdivision of *Typhis*, which does not much concern us at the present, and which seems to be less justified; for it must be admitted that Jousseau's groups are fairly natural, and exist in nature, though I do not consider them as all of generic value.

It will be noted that Jousseau used *Purpura* as of Tournefort, *Hau-stellum* as of Klein, and used Adamson's species-names. The three authors named do not now enter into systematic conchological work, as they are all pre-Linnean.

The earliest post-Linnean use of the genus-name *Purpura* is by Martyn, who utilized it in the Tournefortian sense, though in connection with an exotic species, as noted above.

The three Neozelanic species are very difficult to place, being somewhat aberrant however they are viewed. I have been puzzled to generically locate *Murex zelandicus* Quoy and Gaimard, and on Mr. E. A. Smith's suggestion I leave it for the present under *Murex* as here restricted, but would emphasize the use of Jousseau's name *Poirieria* in connection with it subgenerically, as it shows very distinct characters, and it stands out wherever it is placed in the family *Muricidae*.

Murex octogonus Quoy and Gaimard is just as peculiar, and it does not match easily with any other species. Jousseau placed it with *Murex stainforthii* Reeve in the genus *Bassia* proposed for this shell. *Bassia* is, however, invalid. In the British Museum collection it has been placed under *Ocinebra*, but it is obviously out of place, and the radula shows the

characters of *Hexaplex*. It may, therefore, be so classed, but a subgeneric name should be used to emphasize the peculiarities of this form. I therefore propose "*Murexsul* subgen. nov.," and name *Murex octogonus* Quoy and Gaimard as type.

The small shells classed about *Murex angasi* (Crosse) certainly fall into *Pteronotus*. Suter placed them in the section *Alipurpura*, but that section differs very little from *Pteronotus* s. str., while the above-named shell was described as a *Typhis*, and has the canal completely closed when adult. Jousseau proposed *Poropteron* for *Murex uncinarius* Lam., which is undoubtedly congeneric.

The result of this determination would give the following reading of the Neozelanic species:—

Genus MUREX Linné, 1758.

Subgenus *Poirieria* Jousseau, 1879.

Murex zelandicus Quoy and Gaimard, 1833.

Genus HEXAPLEX Perry, 1811.

Subgenus *Murexsul* nov.

Hexaplex octogonus (Quoy and Gaimard, 1833).

——— var. *umbilicatus* (Ten.-Woods, 1876).

——— var. *espinosus* (Hutton, 1886).

Genus PTERONOTUS Swainson, 1833.

Subgenus *Poropteron* Jousseau, 1879.

Pteronotus angasi (Crosse, 1863).

——— var. *eos* (Hutton, 1873).

Trophon stangeri (Gray, 1843). [P. 406.]

This name has been rejected by Suter in favour of the prior *Purpura rugosa* Quoy and Gaimard, 1833. It is pleasing to me to find that there is a prior *Purpura rugosa* Lamarek, Anim. sans Verteb., vol. vii, p. 242, 1822, so that we can revert to the above well-known name.

Xymene gen. nov. [P. 410.]

I propose this genus-name, and name *Fusus plebeius* Hutton, 1873, as type. *Kalydon* Hutton, 1884, that would otherwise be used for these shells, is invalidated by the prior *Calydon* J. Thomson, Syst. Ceramb., p. 263, 1864. The two names are absolutely the same, the C and K in this case being interchangeable. These miniature coloured "*Trophons*" form an easily recognized group to me, but, as observed in the succeeding note, my interpretation is not coincident with that of my friend Mr. Charles Hedley.

Xymene quirindus nom. nov. [P. 415.]

This name is given to replace *Trophon paivae* Suter, p. 415, not *Trophon paivae* Crosse, 1864.

Hedley (Proc. Linn. Soc. N.S.W., vol. xxxviii, 1913, p. 329) has written, "By Tryon, *T. paivae* Crosse was united to *T. hanleyi* Angas, a decision which has misled Australian collectors. . . . Not only are these two clearly distinct (from examination of types), but *T. paivae* . . . should be regarded as a synonym of *T. recurvus*. Probably when Professor Hutton wrote that *Trophon paivae* belonged to this new genus *Kalydon* he intended to refer to *T. hanleyi*." Then Hedley retained *Trophon recurvus* Philippi in the genus *Trophon*, and used *Kalydon* (p. 330) for a species which I con-

sider generically distinct from the Neozelanic "*Kalydon*," and which I would unhesitatingly class with *Purpura scobina* Quoy and Gaimard in the genus *Lepsiella*, with that species as type. As a synonym of "*Kalydon*" *vinosus* (Lamarek), Hedley seems to quote *Ricimula adelaidensis* Crosse and Fischer. From the series in the British Museum I assert that this is a distinct species; as far as I can judge, it is an impossible variation.

Under the above circumstances *Trophon recurvus* Philippi would replace *Trophon paivae* Crosse, but two factors intervene. Hedley suggests that Hutton intended *Fusus hanleyi* Angas when he used Crosse's name. When I studied the Australian shells named *Trophon paivae* in the Australian Museum I did not recognize in them the Neozelanic shells so named. The latter, however, resemble *T. paivae* more closely than they do *F. hanleyi* Angas. I consequently propose the above name for the Neozelanic shells, and thus obviate the introduction of an erroneous name into the Neozelanic list. Suter's description does not apply to the types of *paivae* Crosse = *recurvus* Philippi, nor *hanleyi* Angas, all of which I have examined in connection with this note.

Fam. Thaididae Dall. [P. 420.]

The arrangement of the Neozelanic species of this family is probably based on Dr. Dall's paper in the U.S. Geol. Survey, Professional Paper 59, to which Suter refers the Neozelanic student for full synonymy. That paper will not, however, be commonly available to such; and, moreover, it is of such a skeletal nature as to prohibit usage in connection with austral shells. I here give the synopsis provided by Dall, so that my criticisms may be followed by the reader:—

Genus *THAIS* Bolten, 1798.

Subgenus *Thais* s. str.

Section *Thais* s. str. Type: *T. neritoides* = *M. fucus* Gmel.

Tribulus H. & A. Ad., 1853. Type: *T. planispira* Lam.

Pinaria H. & A. Ad., 1853. Type: *T. coronata* H. & A.
Ad. = *adamsi* Dall.

Mancinella Link, 1807. Type: *T. mancinella* Gmel.

Stramonita Schum., 1817. Type: *T. haemastoma* Linn.

Lepsia Hutton, 1853. Type: *T. haustum* Maityn.

Patellipurpura Dall, nov. Type: *T. patula* Lam.

Plicopurpura Cossm., 1903. Type: *T. columellaris* Lam.

Subgenus *Nassa* Bolten, 1798. Type: *T. sertum* Lam.

Subgenus *Cronia* H. & A. Ad., 1853. Type: *T. amygdala* Kiener.

Subgenus *Nucella* Bolten, 1798.

Section *Nucella* s. str. Type: *T. lapillus* Lam.

Trochia Swains., 1840. Type: *T. cingulata* Linné.

Dall has also given a general synonymy without placing the synonyms under the sections or subgenera. He has stated that the animals vary little, and that shell characters appear to become confused. I think this latter statement is due to the lack of study of juveniles and their growth-stages. If this were undertaken, probably much of the confusion would be dispelled. It must be obvious that in a littoral genus such as *Thais* similar environmental stress must have brought about similar shell-formation in many cases. I have studied the Neozelanic and Australian species through many stages, and I have already expressed my disapproval of the unsatisfactory nature of Dall's classification when applied to austral species.

Dr. Dall courteously wrote me that he was really not well acquainted with these, and hoped that Antipodean workers would deal with them. Previous to the receipt of this letter I had proposed *Lepsiella* for *Purpura scobina* Quoy and Gaimard and *Neothais* (typographical error, *Neothias*) for *Purpura smithi* Brazier.

Suter has synonymized *Lepsiia* Hutton, 1884, with *Thais* Bolten, 1798, as an absolute synonym; he then admitted (p. 423) *Stromonita* Schumacher as a subgenus, to which he allotted the species *succinata* (Martyn) and *tritoniformis* (Blainville), not quoting any synonyms, though the latter species has a generic synonymy of its own. A third subgenus, *Nucella* Bolten, is recognized, and thereto is added the species *striata* (Martyn) and *scobina* (Quoy and Gaimard). This sequence cannot be recommended, as the conchological relationship of *T. succinata* (Martyn) and *T. striata* (Martyn) is much greater than that between the former and *T. tritoniformis* (Blainville), or between the latter and *T. scobina* (Quoy and Gaimard). Suter has classed *T. haustum* (Martyn) in the same subgenus as *T. neritoides* Bolten, and has quoted Troschel's description and figure of the radula. It might be of use to the Neozelanic student to outline Troschel's classification, as this was prepared solely from radular characters, no value at all being given to shell characters. I suggest that a careful consideration of radular characters in conjunction with shell features as governed by growth would lead to a satisfactory arrangement. Troschel admitted five genera, thus:—

- Thais nodosa* L. (*neritoides* Lam.).
- Purpura patula* L.
- Tribulus hippocastanum* Lam.
- *deltoidea* Lam.
- *pica* Blainv.
- *mancinella* Lam.
- *bitrilocularis* Lam.
- Polytropha lapillus* L.
- *dubia* Kr. (*schultzei* Dkr.).
- *haustum* Q. & G.
- Stromonita chocolata* Duclos.
- *floridana* Comr.
- *bicostalis* Lam.
- *undata* Lam.
- *haemastoma* L.
- *rustica* Lam.
- *blainvillei* Desh.
- *consul* Chem.

This arrangement cannot be confidently criticized, as it has been shown in other groups that the nomination of the species was very inaccurate. In order to emphasize the fact that shell characters and radular characters *do* go hand-in-hand, I would note that *all* the five species Troschel grouped under *Tribulus* were associated together, from shell characters, by H. and A. Adams in their subgenus *Thalessa* (Gen. Rec. Moll., vol. i, p. 127, 1853), and, further, that out of the eight Troschel named in *Stromonita* six appear under the same subgeneric name in H. and A. Adams's work. Further, Troschel placed *haustum* in a different genus from *neritoides*, associating the former with the British *lapillus*. Almost as bad is Dall's subordination of *Trochia* Swainson to *Nucella* Bolten, which he used for *lapillus* L. Upon

investigation I find that Dall had overlooked the introduction by Perry in his "Conchology" (1811) of the genus *Haustrum*. This genus included several species, of which one was *Haustrum zealandicum* Perry. By tautonymy this becomes the type species of the genus, as it is the species named *Buccinum haustrum* by Martyn in 1784. This name will therefore displace *Lepsia* Hutton, 1883. The acceptance of generic names to indicate the groups seems the most satisfactory method to advocate, as the shells have been so variously grouped. A study of the wanderings of *B. haustrum* Martyn should convince any one of the propriety of this step.

In the family *Thaididae* I would therefore read,—

- Genus **HAUSTRUM** Perry, 1811. *Haustrum* Perry, "Conchology," pl. xlv, 1811. Type: *Buccinum haustrum* Martyn. Synonym: *Lepsia* Hutton, Trans. N.Z. Inst., vol. xvi, p. 222, 1883: same type.
Haustrum haustrum (Martyn, 1784). Synonyms: *B. haustorium* Gmelin, 1791; *Haustrum zealandicum* Perry, 1811.
- Genus **NEOTHASIS** Iredale, 1912 (em.). *Neothias* (error type) Iredale, Proc. Mal. Soc. (Lond.), vol. x, p. 223, 1912. Type: *Purpura smithi* Brazier.
- Neothais succincta* (Martyn, 1784). Synonyms: *B. orbita* Gmelin, 1791; *P. textiliosa* Lamarek, 1816.
- Neothais smithi* (Brazier, 1889). Synonym: *P. striata bollonsi* Suter, 1906.
- Neothais lacunosa* (Bruguière, 1789). Synonyms: *B. striatum* Martyn, 1784, not Pennant, 1777; *P. rugosa* Lamarek, 1820; *P. rupestris* Valenciennes, 1833.
- Genus **AGNEWIA** Tenison-Woods, 1878. *Agnewia* Tenison-Woods, Proc. Roy. Soc. Tasm., 1877, p. 29 (1878). Type: *Purpura tritoniformis* Blainville. Synonym: *Adamsia* Dunker, Proc. Zool. Soc. (Lond.), 1856, p. 357: same type: not *Adamsia* Forbes, 1840.
- Agnewia tritoniformis* (Blainville, 1833). Synonym: *Adamsia typica* Dunker, 1856.
- Genus **LEPSIELLA** Iredale, 1912. *Lepsiella* Iredale, Proc. Mal. Soc. (Lond.), vol. x, p. 223, 1912. Type: *Purpura scobina* Quoy and Gaimard.
- Lepsiella scobina* (Quoy and Gaimard, 1833).
- var. *albomarginata* (Deshayes, 1839). Synonyms: *tristis* (Dunker, 1866); *biconica* (Hutton, 1878)
- var. *rutila* (Suter, 1899).

Neothais succincta (Martyn, 1784). [P. 423.]

This species does not occur at the Cape of Good Hope, as given by Suter, but is restricted to the east coast of Australia, as far north as the Peronian region extends, and along the south and west in the limits of the Adelaidean region. It does not extend to New Caledonia, as far as I have traced, but is abundant at Norfolk Island, and very rare at the Kermadecs.

The Cape of Good Hope shell which has been confused with it is *Trochium cingulata* (Linné). The adults bear a superficial resemblance, but the immature and juvenile shells differ entirely, and prove that no close relationship between the two shells, which I place in different genera, exists. The variety "*textiliosa*" puzzles me greatly, as it occurs under the same environmental conditions, and is continually a stouter shell. May the difference be sexual?

Agnewia tritoniformis (Blainville, 1833). [P. 424.]

This shell, described as a *Purpura*, was redescribed with a new generic name *Adamsia*, which, being invalid, was changed to *Agnewia*. Writers desirous of neglecting this name have succeeded in putting it into *Cominella* and *Urosalpinx*. Such diversity of opinion indicates the acceptance of *Agnewia*. Kesteven, prejudiced by the presence of the sinusigera apex, concluded that it must revert to *Purpura*, now *Thais*, where Suter has placed it. In shell characters it stands quite alone, and Dall failed to place it, so ignored it. It agrees with no other *Thais* (sensu lato) I know. It is common on the littoral of New South Wales, where I myself collected it, and abundant as a shore shell at Lord Howe and Norfolk Islands. Its range is coincident with but much less extensive than the preceding, apparently not reaching mid Western Australia, nor did I find it at the Kermadecs.

Neothais lacunosa (Brugière, 1789). [P. 425.]

As noted by Suter, the name he used, *Thais striata* (Martyn, 1784), was invalid through the prior use of Martyn's name by Pennant (Brit. Zool., ed. 4, vol. iv, p. 105, 1777), while that is also antedated by O. F. Müller (Vermes, vol. ii, p. 149, 1774). The above name seems to have the next choice.

I noted in another place that *Buccinum bicostatum* Brugière, *loc. cit.*, p. 248, was cited as a synonym. As this was ten pages earlier I looked it up, and found that, although Brugière cited exactly the same figures and descriptions in both places, he described two quite different shells. Suter adds, "Also Kerguelen's Land": I have not yet seen shells so identified from this locality, but it is almost certain that this is wrong. It appears to replace *N. succincta* (Martyn, 1784) in the Neozelanic region, though it cannot be considered an evolutionary product.

Lepsiella scobina (Quoy and Gaimard, 1833). [P. 426.]

This species is confined to New Zealand, and Suter's note, "Tryon says that it occurs at the Cape of Good Hope, and it appears also in Gibbons's 'List of South African Mollusca,' 1888," shows he also doubted its extralimital occurrence. The South African species so confused is early separable, and has an earlier name than the present one. I have examined specimens, and should class as a nearer ally to the Neozelanic shell the Australian *P. neglecta* Angas, and the shell classed by Hedley (Proc. Linn. Soc. N.S.W., vol. xxxviii, 1913, p. 330) as *Kalydon vinosus* (Lamarek). The fact that the latter has been described as a *Buccinum* (*Ricinula*), *Cominella*, and *Purpura*, and is thence transferred to *Kalydon*, which is not congeneric, shows the necessity of my genus-name *Lepsiella*. As I have shown *ante*, *Kalydon* is invalid, so that recourse may be to *Lepsiella* for the whole group, a course I do not advise.

Neothais smithi (Brazier, 1889). [P. 428.]

Drupa must be omitted from the Neozelanic fauna, as it is included for this species alone. I showed that *Drupa bollonsi* Suter was equivalent to the earlier *Purpura smithi* Brazier, and noted that it was not a *Drupa* at all, but was better classed in *Thais* (sensu lato). Suter (p. 1083) has accepted my specific identification, but has written, "For the present I see no reason why it should not be retained in that genus (*Drupa*)." The

shell is very closely related to *N. lacunosa* (Bruguère), and I know of no species classed in *Drupa* (sensu lato) that approaches it. The type of *Drupa* is representative of a group which is well separated from the small high-spired tuberculose species which the *N. smithi* Brazier vaguely recalls. For this group, which I generically separate, Schumacher's name *Morula* is available. I will elaborate this matter in another place.

Alcira inconstans (Suter, 1906). [P. 442.]

This species was named *Columbella varians* by Hutton (Trans. N.Z. Inst., vol. xvii, 1884, p. 314, pl. 18, fig. 2 (1885)), and as this name was invalid on account of the prior *Columbella varians* Sowerby, Proc. Zool. Soc. (Lond.), 1832, p. 118, it was altered to the above specific name by Suter himself in 1906. The recognition of the species as referable to the genus *Alcira* does not validate the invalid species-name.

Suter has distributed the Neozelanic "Columbellids" in four genera, the genus-name *Columbella* being eliminated from our fauna. I emphatically approve of his action, though it may be that the generic names selected by Suter will not prove the most acceptable when a monographic *résumé* of the family is undertaken. I have many species to study from Lord Howe, Norfolk, and the Kermadec Islands, and will investigate the status of the Neozelanic species at the same time.

Ancilla novaezelandiae (Sowerby, 1859). [P. 453.]

Through an extraordinary mistake this species is named *Ancilla bicolor* Gray, 1847, a remark being given, "The above synonymy is based on information kindly supplied to me by Mr. E. A. Smith, L.S.O., of the British Museum."

Hedley (Proc. Linn. Soc. N.S.W., vol. xxxviii, p. 302, 1913) has indicated how this error occurred, and that *Ancillaria tricolor* was described by Gray at the place given from "Cape York, on sand; cabinet of Mr. Cuming." He also showed that Gray's specific name fell as a synonym of the prior *Ancillaria cingulata* Sowerby, 1830, but that the Australian and Neozelanic species were quite distinct.

Confirmation of Hedley's data shows that the above name becomes valid for the latter, and replaces *Ancilla bicolor* Suter, there being no such species as *A. bicolor* Gray, the name being *A. tricolor* Gray.

Bathytoma zealandica (E. A. Smith, 1877). [P. 491.]

This name must be resumed for the species called *Bathytoma cheesemani* Hutton, 1878, Suter's reason reading, "As Mr. E. A. Smith's species was never figured, I give preference to Hutton's name."

Mangilia? *amoena* (E. A. Smith, 1884). [P. 502.]

In the same manner this name must be used instead of *Mangilia protensa* Hutton, 1885, selected for the same reason as the preceding by Suter. I have placed a ? after the genus used by Suter, because I have not yet studied this difficult group sufficiently to publish the most acceptable genera to be used for Neozelanic shells. Dall's conclusion is that *Mangilia* is not applicable to the shells commonly so called, but the correct alternative in most cases is not given, his notes only referring to North American species.

Genus *Bullinula* (Swainson, 1840). [P. 521.]

Bullinula Swainson. Treat. Mal., p. 360. 1840, must replace *Bullina* Férrussac, 1821, as there is a prior *Bullinus*. Suter has accepted this dictum, as he has used *Cylichnella* instead of *Cylichna* Lovén, 1846, not *Cylichnus* Burmeister, 1844. The above name will be familiar, as it was used in the "Index Faunae Novae-Zelandiae."

Bullinula ziczac (Muhlfeldt, 1818). [P. 522.]

The species-name must also be changed, as *Bulla scabra* Gmelin, 1791. was antedated by O. F. Müller's selection of the same name in the Zool. Dan., vol. ii, p. 90, 1784. The shells in the British Museum have long borne Muhlfeldt's specific name

Genus *Leuconopsis* (Hutton, 1884). [P. 592.]

For the Neozelanic shells Suter has degraded Hutton's genus to the rank of a section under *Leuconia* Gray. It has been overlooked that as long ago as 1903 the latter name was abandoned by British malacologists for the British species. B. B. Woodward, in his "List of Non-marine Mollusca" (Journ. Conch., vol. x, p. 355, 1903), utilized Bivona's name *Ovatella*, writing on p. 361, "*Leuconia* is a synonym, as Gray himself admits in 1847. for *Ovatella* of Bivona, 1832."

As the Australasian group is at present well defined, I cannot see any reason to recommend the adoption of Bivona's name, but would urge the reinstatement of the absolutely correct one, *Leuconopsis* Hutton. As Suter quotes, I would only admit one species as at present known in New Zealand waters.

Genus *Marinula* King, 1831. [Pp. 591, 594.]

When Mr. Hedley was in England I pointed out that *Cremnobates* was synonymous with *Marinula* King, and upon examination of the types of the two genera he concurred in this view. My friend Mr. M. Connolly, during the preparation of his invaluable "Reference List of South African Non-marine Mollusca" (Annals South Afr. Museum, vol. xi, 1912), referred to me as to the status of the Neozelanic forms. We carefully investigated the whole matter, and Connolly will publish the results, many complications intervening. The fact that the two species referred by Hedley and Suter to the genus *Cremnobates*—viz., *M. maindroni* Vélain and *M. nigra* (Philippi) Vélain—are typical *Marinula* at once discredits *Cremnobates*; but the further fact that *Marinula nigra* Philippi is a synonym of *M. pepita* King, the type of *Marinula*, must be convincing proof of its invalidity. As Connolly's paper will be published in South Africa, and will not commonly come under the notice of the Neozelanic student, I might give the following notes suggested by Connolly's MS., which is now before me.

Marinula pepita King, gen. and sp. nov., was described from the Island of Chiloe, South America. The distribution of typical specimens, probably under manuscript names, caused the description of such as *Auricula nigra* Philippi, King's name having meanwhile been twisted on to a Chilian shell superficially agreeing. This transference became universal, and in the British Museum the type set of *Marinula pepita* King bore on the front the name "*nigra* Phil.," whilst distinct shells, not even referable to the genus, were named "*pepita* King." This confusion existed also in France and Germany, and brought about the record of *M. nigra* Philippi from Tristan da Cunha, &c.

When Hedley and Suter reinstated *Cremnobates* they were confronted with a description of the animal of *Marinula* probably drawn up from some other beast. Connolly has persuaded Mr. G. C. Robson to provide an account of the anatomy of the Tristan da Cunha form, and this agrees fairly with that given by Hedley and Suter, but that is too incomplete to make any useful comparisons.

Connolly has defined the limits of *Marinula*, including *Cremnobates*, as antarctic and subantarctic, of circumpolar range, advancing very little to the northward, reaching Moreton Bay in east Australia and the Island of Chiloe in west South America.

The two Neozelanic species of *Marinula* then will be: *Marinula filholi* Hutton, 1878, and *M. parva* (Swainson, 1855); and *Cremnobates* must be cited in the synonymy of *Marinula*.

Genus *Siphonaria* (Sowerby, Jan., 1824). [P. 597.]

As an overlooked synonym, should be added: *Mouretus* Blainville, Dict. Sci. Nat. (Levrault), vol. xxxiii, pp. 161-62, 1824 (after Sowerby). Type: *Mouretus adansonii* Blainville.

Kerguelenia innominata nom. nov. [P. 601.]

Under the name *Siphonaria lateralis* Gould, 1846, Suter has described a shell occurring at the subantarctic islands of New Zealand: for this shell I provide the above name. As a subgenus-name without reference *Liriola* Dall, 1870, is given; but when that name was provided Dall wrote (Am. Journ. Conch., vol. vi, 7th July, 1870, p. 32), "typified by *Siphonaria thersites* Cpr.," and the subantarctic shells do not fall into Dall's group.

Rochebrune and Mabile (Miss. Sci. Cap Horn, vol. vi, Zool., H, p. 27, 1889) introduced *Kerguelenia* for *S. redimiculum* Reeve. This name Suter records as a synonym of *S. lateralis* Gould, but would separate *S. tristensis* Leach.

Examination of the British Museum material, where the types of *redimiculum* Reeve, *macgillivrayi* Reeve, *tristensis* Leach, and paratypes of *lateralis* Gould are preserved, gives the following results: *S. lateralis* Gould is quite a distinct species from *redimiculum*, *macgillivrayi*, and *tristensis*, which agree very closely, but seem to be geographical races, according to the series available, quite constant.

The Neozelanic species does not agree, and consequently I have named it as above.

The species of *Kerguelenia* are recognizable at sight, but the genus would seem to include *S. obliquata* Sowerby and *S. australis* Quoy and Gaimard; but the species *S. cookiana* Suter and *S. zelandica* Quoy and Gaimard would be better placed in *Siphonaria*. Suter observes that the radular characters of *S. australis* Q. & G. and *S. zelandica* Q. & G. notably differ.

Suterella gen. nov. [P. 618.]

As a representative of the otherwise extra-limital genus *Fretum*, Suter admits *Helix novaræ* Pfeiffer, 1862. The synonymy given indicates the peculiar nature of this mollusc, this being the sixth generic location quoted by Suter, four being his own attempts to place it. This last is quite as unsuitable as any of the preceding, as I have examined typical species of *Fretum* as well as many specimens of the Norfolk Island molluscs unfortunately associated by Sykes with the Fijian shells, which are the true *Fretum*, and the Neozelanic shell shows discord when grouped with these.

The name above given, with *Helix novaræ* Pfeiffer as sole species and type, will call attention to the nature of this mollusc, and probably some investigator will endeavour to fix its place in connection with extra-limital species.

Fam. Flammulinidae Iredale. [P. 621.]

Suter's classification of the land *Mollusca* is decidedly an improvement on any preceding it, but still emendations must be made. Thus, Suter diagnoses his family *Phenacohelicidae*, and notes, "tail with a mucous pore," as contrasted with the family *Endodontidae* (p. 684), whose chief feature is "no caudal mucous pore."

Study of the Neozelanic land molluscs in connection with my Kermadec molluscs and in conjunction with the majority of Australian species led me to suggest the above family-name (Proc. Mal. Soc. (Lond.), vol. x, p. 382, 1913). I there showed that the presence or absence of a caudal mucous pore was not constant in the "*Endodontidae*," and concluded that it was certainly valueless as a family character. I noted Suter himself had previously indicated this conclusion, so that it should not have been utilized in the present work. I further added that Suter had claimed the nature of the jaw as characteristic of the *Flammulinidae*, and I suggested that shell features would prove of more satisfying value than the evanescent caudal mucous pore. I advocated the recognition of many genera, instead of few, and I now see that Suter has divided the genus *Endodonta* into numerous groups, but has not given these names. I have not carefully studied all these yet, but from a close criticism of the Australian species I found constant characters for separation in the sculpture of the nuclear whorls, the ratio of coiling, the form of the umbilicus, and also adult sculpture, so that I am certain easily recognized groups could be named. I pointed out that Pilsbry's classification, upon which Suter's is based, has been since amended by himself in the manner I propose.

A few criticisms may be hereafter given, but a monographic consideration of the Neozelanic forms must be carried out under a scheme covering Australian and Pacific forms. The latter are very imperfectly known, and I would again emphasize the sometimes overlooked fact that the classification being used by Suter has already been rejected by its author as inadequate. My own remarks in this connection in the paper quoted above have been endorsed by most workers both here and in America. Dr. Pilsbry has written me that recent study of the Sandwich Island "Endodonts" has given him ground for drafting a rearrangement of the Pacific forms, and that he agrees that too much lumping has hitherto been done, and that the caudal mucous pore has been a "will-of-the-wisp."

Phelussa gen. nov. [P. 622.]

Phelussa is here provided to replace *Phacussa* Hutton, 1883, which is pre-occupied, and I name *Helix hypopolia* Pfeiffer, 1853, as type of my genus.

The distribution given of the genus by Suter reads, "New Zealand and Tasmania." In this case Suter is probably correct, but when he studied Tasmanian shells his generic locations were not sound, and he has since rejected most.

In this connection he includes Lord Howe Island in the distribution of his family *Phenacohelicidae*, but I have seen no species from that island (nearly one hundred are now known to me) which could reasonably be included in any of the fourteen genera he recognizes in his family. Lord

Howe Island is mentioned only under the genus *Flammulina* (p. 671), but I have seen no species of *Flammulina* from that island or Norfolk Island, also named.

Therasia? *antipoda* (Hombron and Jacquinot, 1841). [P. 655.]

Suter accepts the above name as of these authors (1854) in preference to *Helix aucklandica* Le Guillou, Rev. Zool., v, 1842, 140, with the remark, "I accept H. & J.'s. name because they figured the species." This is not a valid reason, and we should, on the score of priority, have had to accept Le Guillou's name had I not observed that Hombron and Jacquinot had published a preliminary description, which appeared before Le Guillou's name. Consequently the above name can be preserved, the earliest reference reading, "*H(clyx) antipoda* Hombron and Jacquinot, Ann. Sci. Nat., 2nd ser., vol. xvi, p. 64, 1841: Auckland Islands." When the names, accredited to Hombron and Jacquinot, were published in 1854 the recorder was Rousseau, but in the above-noted paper many species were published by Hombron and Jacquinot themselves. This paper seems to have been overlooked.

Flammulina zebra (Le Guillou, 1842). [P. 680.]

Vitrina zebra Le Guillou, Rev. Zool., v, 1842, 136, is placed in the synonymy of *Helix phlogophora* Pfeiffer, 1850, with the remark, "The specific name *zebra* has, no doubt, priority; but, as no figure of the shell was given, I select Pfeiffer's *phlogophora* as being the next in chronological order, and which was figured by Reeve. Moreover, I have not seen Le Guillou's species from the Auckland Islands, which is narrowly umbilicated, and may be distinct from *F. phlogophora*." Only two courses are open—the usage of Le Guillou's name *zebra*, or its admission into the synonymy of *phlogophora* Pfeiffer with a ?. Suter suggests they are different species. Search at the Auckland Islands is really necessary to determine such a question, and that is not so easy a matter as to write that it should be done.

Genus *Endodonta* (Albers, 1850). [P. 684.]

I have proposed the rejection of this generic name from the Neozelanic fauna, and this course will sooner or later be adopted, as the worker responsible for its introduction into that fauna has regretted his action, and latterly repudiated it.

Suter has classed thirty-seven species, four subspecies, five varieties, and seven formae under this genus-name. Five subgenera are recognized, and it would have been easy simply to write that these should be recognized as genera; but unfortunately the first two subgenera used by Suter cannot be differentiated by the descriptions he has given, which are copied from Pilsbry's "Guide to the Helices" (Man. Conch., 2nd ser., vol. ix, 1893). In my paper quoted above (the only one I have yet written dealing with Australasian land molluscs) I suggest their identity. I there stated, however, that later many genera might be recognized when the animals were carefully studied in conjunction with their shells. In the meanwhile I would suppress *Thaumatodon* and simply generically use *Ptychodon*. The recognition of *Phenacharopa* as a distinct genus cannot be denied whilst *Aeschrodomus* claims generic rank. *Charopa*, however, covers many generic types, and it is pleasing to read (p. 700) Suter's memo, "In my opinion, only very few of the Tasmanian and Australian species assigned to *Charopa*

really belong to it," as I had written, "It appears doubtful whether typical *Charopa* has yet been recorded" from Australia.

In this subgenus (*Charopa*) Suter distinguishes five groups, and here again he has utilized the protoconch features to a large extent, *exactly as I had done*, though my work was quite independently performed. Inasmuch as the coincidence is fairly exact, and I was working upon Australian material, kindly loaned me by Mr. J. H. Ponsonby, whose collection of these shells is very complete, and also extra-limital Pacific shells, while Suter was criticizing Neozelanic shells, the groups may be considered quite natural, and I here propose some of the generic names I had conferred in my manuscript dealing with Australian shells. Many others will later be proposed by other workers as well as myself. I introduce,—

Egestula gen. nov. Type: *Helix egesta* Gray, 1850.

Fectola gen. nov. Type: *H. infecta* Reeve, 1852.

Mocella gen. nov. Type: *H. corniculum* Reeve, 1852.

Cavellia gen. nov. Type: *H. biconcava* Pfeiffer, 1853.

The genus *Ptychodon* as hereafter admitted is polyphyletic, but none of the species assigned to *Thaumatodon* by Suter agree at all with the type he has named.

My nomination of the genus *Endodonta* of Suter would then read,—

Genus PTYCHODON Aney, 1888.

Ptychodon cryptobidens (Suter, 1891).

— *jessica* (Hutton, 1883).

— *monoplax* (Suter, 1913).

— *tau* (Pfeiffer, 1862).

— *varicosa* (Pfeiffer, 1853).

— *iredalia* (Webster, 1908).

— *aorangi* (Suter, 1890).

— *chiltoni* (Suter, 1909).

— *hectori* (Suter, 1890).

— *hunnuaensis* Suter, 1894.

— *leiodus* (Hutton, 1883).

— *microundulata* (Suter, 1890).

— *minuta* (Suter, 1909).

— *pseudoleioda* (Suter, 1890).

— *ureweraensis* (Suter, 1899).

— *wairarapa* (Suter, 1890).

Genus PHENACHAROPA Pilsbry, 1893.

Phenacharopa novoseelandica (Pfeiffer, 1853).

Genus AESCHRODOMUS Pilsbry, 1892.

Aeschrodomus barbatulus (Reeve, 1852).

— *stipulatus* (Reeve, 1852).

Genus CHAROPA Albers, 1860.

Charopa anguicula (Reeve, 1852).

— *montivaga* Suter, 1894.

— *benhami* (Suter, 1909).

— *bianca* (Hutton, 1883).

— *chrysaugia* (Webster, 1904).

— *coma* (Gray, 1843).

— *ochra* (Webster, 1901).

— *pseudocoma* (Suter, 1894).

— *titirangiensis* (Suter, 1896).



Genus *EGESTULA* nov.

- Egestula egesta* (Gray, 1850).
- *gaza* (Suter, 1909).
- *transenna* (Suter, 1904).

Genus *PECTOLA* nov.

- Pectola alpestris* (Suter, 1891).
- *brouni* (Suter, 1891).
- *buccinella* (Reeve, 1852).
- *serpentinula* (Suter, 1891).
- *caputspinulae* (Reeve, 1852).
- *colensoi* (Suter, 1890).
- *eremita* (Suter, 1891).
- *infecta* (Reeve, 1852).
- *irregularis* (Suter, 1890).
- *mutabilis* (Suter, 1891).
- *otagoensis* (Suter, 1899).
- *reeftonensis* (Suter, 1892).
- *roseveari* (Suter, 1896).
- *sterkiana* (Suter, 1891).
- *subinfecta* (Suter, 1899).
- *tapirina* (Hutton, 1883).
- *varicostata* (Suter, 1890).

Genus *MOCCELLA* nov.

- Mocella alloia* (Webster, 1904).
- *corniculum* (Reeve, 1852).
- *kenepuruensis* (Suter, 1909).
- *prestoni* (Sykes, 1895).
- *segregata* (Suter, 1894).

Genus *CAVELLIA* nov.

- Cavellia biconcava* (Pfeiffer, 1853).
- *huttoni* (Suter, 1890).
- *moussoni* (Suter, 1890).
- *subantialba* (Suter, 1890).
- *vortex* (Murdoch, 1897).
- *microrrhina* (Suter, 1909).

The association of species is Suter's, and is open to revision.

Genus *Laoma* (Gray, 1840). [P. 733.]

This genus, as utilized by Suter, is obviously polyphyletic. The type is quite unlike the majority of the species associated with it. I have not studied the species sufficiently to give a correct revised grouping. *Phrixgnathus* should be generically utilized at once, whilst my investigation of the Kermadec land molluscs forced me to introduce a new genus *Paraluoma*: the Neozelanic *Laoma lateumbilicata* seems to fall into this. Suter's groups in this genus under the subgenus *Phrixgnathus* are very artificial, being based on the width of the umbilicus. I believe that study of the apical features will aid in forming a natural grouping of this family also, and I hope to provide such when I indicate the Endodontoid genera, as well as the groups of the *Flammulinidae*, where I have also found the apical features constant and valuable.

Vomanus subgen. nov. [P. 795.]

I provide this name for *Conophora* Hutton, 1879 (em.), from *Konophora*, as there is a prior *Conophorus* Meigen, Mag. f. Insek. (III.), ii, p. 268, 1803, and these are undoubtedly the same word. It will be observed here that Suter has used *Conophora* em. for *Konophora* given by Hutton, an exactly parallel case to *Calydon* and *Kalydon*. The latter name was also given by Hutton, who consistently used K, and, though in the present case emendation was made, it was not in the case of *Kalydon*.

The inclusion of the East African *Parmarion? Kersteni* in the family *Athoracophoridae* seems an obvious error, the geographical distribution of the family, without the species, being quite natural. I would constantly query such an entry as being unnatural, considering our present knowledge of slug forms.

Nucula simplex A. Adams. [P. 833.]

From examination of the types preserved in the British Museum, Hedley (Proc. Linn. Soc. N.S.W., vol. xxxviii, p. 263, 1913) has shown the synonymy of *Nucula simplex* A. Adams, *N. strangei* A. Adams, and *N. antipodum* Hanley. He has preserved the first-named, apparently on the score of priority, quoting the years 1856, 1860, and 1860. Suter has, however, given the correct quotation and correct date for the second—viz., 1856. As a matter of fact, the first two names occur on the same page. Nevertheless, Hedley's choice must be maintained, as it has place priority.

The synonymy would read then: *Nucula simplex* A. Adams, Proc. Zool. Soc. (Lond.), 1856, p. 52; *Nucula strangei*, id. ib.; *Nucula antipodum* Hanley, Thes. Conch., vol. iii, p. 159, pl. 230, fig. 155, 1860.

Genus *Nuculana* (Link, 1807). [P. 834.]

This name must supersede *Leda* Schumacher, 1817, or else a new name altogether must be provided for the genus. British conchologists have adopted the former, but Dall advised its rejection, as being simply a substitute name for *Nucula* Lamarck. Jukes-Browne (Journ. Conch., vol. xi, p. 100, 1904) discussed the merits of the two names, but with little access to much literature, and mainly dependent upon second-hand information, no conclusion was reached. Dall's reason for the rejection of *Nuculana* may be sound, but, as Jukes-Browne concludes, "It is, of course, quite possible that some conchologists will dispute Dr. Dall's reading of Link, and no doubt it is a debatable question." I was quite agreeable to accept Dall's judgment, but was about to point out that authors accepting this had failed to reject *Nassaria*, which is absolutely parallel. However, upon referring to Schumacher, to confirm the introduction of *Leda*, I noted the explanation given for its proposal read, "M. de Lamarck a établi un genre sous le nom de *Nucule* (*Nucula*), et prend pour type de son genre la *Nucule nacrée* (*Nucula margaritacea*) ou l'*Arca nucleus* Lin. En examinant soigneusement cette coquille, j'ai trouvé que la charnière a beaucoup plus de rapport avec celle de la Pectoncle; et c'est pourquoi j'ai changé le nom de son genre en celui que je lui ai donné." I have italicized the last sentence, as this proves Schumacher's name to stand on exactly the same basis as Link's; or, rather, it is worse off, for Schumacher has admitted that his generic name was purely a substitute for *Nucula* Lamarck, whereas it is simply inferred that Link's was so proposed. Under these circumstances *Leda* cannot be preferred to *Nuculana*, but if the latter be rejected the former must also pass into synonymy. I advise the retention of *Nuculana* in preference to the alternative of using an entirely new name.

Arca decussata (Sowerby, 1833). [P. 848.]

If the species *Byssarca decussata* Sowerby be included in the genus *Arca*, the division *Barbatia* being considered as a subgenus only, then some other specific name must be utilized, as there is a prior *Arca decussata* Linné, Syst. Nat., ed. x, 1758, p. 694.

Since the preceding lines were penned Mr. E. A. Smith has investigated this matter, and has discovered from examination of the type that the New Zealand shell is quite distinct from Sowerby's species, and is nameless. His report will be published long before this, when he will indicate the differences, which he has pointed out to me, and which are quite obvious and constant when once recognized.

The range given by von Martens is altogether wrong, as the New Zealand species is confined to New Zealand, and differs at sight from the Australian shell.

Suter's usage of the genus *Arca* to cover every *Arca*-like shell is probably due to Dall's influence, but Dall, when he made his subgenera and sections, used these generically in the same place. Such usage is confusing and perplexing, and, if necessary for convenience, the subgenera should be called genera and the sections subgenera. Thus, on p. 849 Suter recognizes a subgenus *Scapharca*, and on p. 850, as a section, is noted *Bathyarca*. The species is then called *Arca cybaea* Hedley. Now, Hedley is no genus-splitter, yet he named the species *Bathyarca cybaea*. This nomination conveys some idea of the nature of the shell, whereas *Arca cybaea* leaves only a vague impression. The group *Bathyarca* is well defined and easily recognizable, and consequently generic rank should be given it, even if only for convenience' sake.

Subgenus *Mytilus* s. str. [P. 862.]

This must be quoted instead of *Eumytilus* von Ihering, used by Suter. The latter is an absolute synonym of *Mytilus* s. str., and cannot be used under the present nomenclatural laws.

Mytilus maorianus nom. nov. [P. 865.]

I propose this name for the species described by Suter under the name *Mytilus magellanicus* Lamarek, 1819. There is a prior *Mytilus magellanicus* Bolten, Mus. Bolten., p. 158, 1798, based upon Chemnitz Conch. Cab., vol. viii, pl. 83, fig. 738, which is not the present shell. Moreover, specimens in the British Museum from New Zealand differ from South American shells, whilst Purdie showed anatomical differences also.

M. capensis Dunker, given in the synonymy by Suter, does not belong to this species at all, and must be omitted.

Modiolus neozelanicus nom. nov. [P. 866.]

Mytilus ater Zelebor is invalidated by the prior *Mytilus ater* Molina, Sag. stor. nat. Chili, 1782, p. 202. The synonyms quoted by Suter—*Perna confusa* Angas, P.Z.S., 1871, 21, pl. 1, f. 33, and *Mytilus crassus* Ten.-Woods, P.R.S. Tasm., 1876 (1877), 157—are not referable to this species, so the Neozelanic species is nameless, and I provide the new name above.

Genus *Musculus* (Bolten, 1798). [P. 868.]

When Dall (Journ. Conch., vol. xi, pp. 294-97, 1906) reviewed the alterations necessary through the recognition of the Boltenian genera he

wrote, "*Musculus* L. (1. *Anodonta cygnea* L.) = *Anodontites* Brug., 1792 + *Anodonta* Lam., 1799 + *Modiolus* Lam., 1799 + *Modiolaria* Beck, 1840." The reference to *Anodontites* Bruguière, 1792, was probably through the mistaken idea that that genus-name was proposed for a species of *Anodonta* so called. Kennard and Woodward ("List British Non-marine Mollusca," p. 4, 1914) have written, "An attempt having been made by Dr. Haas (Abhandl. Senckenb. Naturf. Gesell., 1910, p. 172) to revive Bruguière's name of *Anodontites* for this genus, it may be as well to point out that the type, *A. crispata* (Journ. Hist. Nat. Paris, 1, 1792, p. 131, pl. viii, figs. 6, 7), is a Guiana shell quite distinct from the European *Anodonta*, and placed by Simpson (Proc. U.S. Nat. Mus., xxii, p. 919) in the genus *Glabaris* Gray (1847), for which it might be used. Lamarek's better-known name is therefore available for the European forms. Therefore *Musculus* cannot be relegated to the synonymy of the earlier *Anodontites*, and, as it is earlier than the other three names mentioned by Dall, demands immediate consideration.

Reference to Bolten (p. 156) shows eight species ranged under the genus-name *Musculus*, thus:—

- Musculus cygneus* = *Anodonta* sp.
- *anatinus* = *Anodonta* sp.
- *compressus* = nomen nudum.
- *discors* = *Modiolaria* sp.
- *novaezeelandiae* = *Modiolaria* sp.
- *moduloides* = *Modiolus* sp.
- *papuanus* = *Modiolus* sp.
- *modulus* = *Modiolus* sp.

It is obvious that the best usage of *Musculus* will be that which will cause the least confusion, and, following the principle of elimination, this name would replace *Modiolaria*. I can see no objection to this course, and therefore designate *Musculus discors* Bolten as type of *Musculus* Bolten. The synonymy will read,—

Genus *MUSCULUS* Bolten, 1798. *Musculus* Bolten, Mus. Bolten., p. 156, 1798. Type: *M. discors* = *Mytilus discors* Linné. Synonyms: *Modiolaria* Beck, 1840, as quoted by Suter; *Modiolarca* Gray in Dieffenbach's "Travels in New Zealand," vol. ii, p. 259, 1843 (not *Modiolarca* Gray, 1847); *Lanistes* Swainson, 1840, and *Lanistina* Gray, 1847, as given by Suter.

Musculus impactus (Herrmann, 1782). [P. 869.]

To the synonymy add: *Mytilus cor* Martyn, Univ. Conch., vol. ii, pl. 77, 1784; and *Musculus novaezeelandiae* Bolten, Mus. Bolten., 1798, p. 157.

Genus *Pecten* (Müller, 1776). [P. 873.]

Hereunder is classed, with subgeneric rank only, *Chlanys* Bolten, 1798, and *Pseudamussium* H. and A. Adams, 1858: as a section of the latter, *Cyclopecten* Verrill, 1897, being cited. Although this classification is based upon that of Dall, and has been used by Mr. E. A. Smith in the "Challenger" Report and since, it is not only inconvenient, but I venture to suggest that it transgresses the facts.

The genus *Hinnites* DeFrance, 1821 (Dict. Sci. Nat., vol. xxi, p. 169), was proposed for fossils which he contrasted with *Ostrea* and *Spondylus*,

and of which he knew no living representatives. These have since been found, and in the British Museum is a fine series showing complete stages of growth. This genus begins life as a normal *Chlamys*, and then settles down and becomes an irregularly shaped Ostreiform bivalve. Fischer (Man. de Conch., p. 945, 1886) has recorded this transformation. As *Chlamys* has coincidentally persisted as a free-swimming form, this proves that *Chlamys* is very ancient, and is fully worthy of generic rank. The close relationship of *Chlamys* and *Hinnites*, two superficially different shells, is proven, but no proof is yet forthcoming that *Chlamys* and *Pecten*, two superficially similar forms, are as closely allied.

Cyclopecten was provided for minute species with a peculiar facies which are recognizable at sight, and their exact relationships seem somewhat obscure. Why such a well-defined group which shows none of the characteristics of the genus *Pecten* should be so classed is a problem I am quite unable to solve.

The nomenclature I would advocate reads,—

Genus PECTEN Müller, 1776.

Pecten medius Lamarek, 1819.

Genus CHLAMYS Bolten, 1798.

Chlamys dichrous (Suter, 1909).

— *imparicostatus* (Bavay, 1905).

— *radiatus* (Hutton, 1873).

— *zelandiae* (Gray, 1843).

— *convexus* (Quoy and Gaimard, 1835).

Genus CYCLOPECTEN Verrill, 1897.

Cyclopecten ariculoides (E. A. Smith, 1885).

— *transenna* (Suter, 1913).

In this arrangement I note I am in agreement with Hedley (Mem. Austr. Mus., iv, pp. 303-7, 1902). The reference of all the species to *Pecten*, as Suter has done, would necessitate the rejection of two specific names, as *medius* Lamarek, 1819, and *radiatus* Hutton, 1873, are antedated in the genus *Pecten* (sensu latissimo), but not in my usage.

Pecten gemmulatus (Reeve, 1852). [P. 878.]

This species is recognized as a subspecies of *P. zelandiae* Gray, 1843, but it must be omitted.

Mr. Edgar Smith, L.S.O., dealing with a *Pecten* from New Zealand, asked me if I recognized it. I did not: but as he was getting the species together I took the opportunity of examining the specimens. The types of Reeve's *Pecten gemmulatus* at once attracted me by their strange appearance, and it was soon decided that these were not Neozelanic, as far as we could judge. Though Reeve gave the locality as "New Zealand," the type-tablet bears the original data "Moreton Bay; Strange." Nothing is here known like them, and they disagree in detail with Suter's description of his sub-specific form.

Pecten multicostatus Reeve, included by Suter in the synonymy of *P. zelandiae* Gray, must also be omitted, as it is not that shell, and the locality "New Zealand" would appear to be incorrect.

Genus Gaimardia (Gould, 1852). [P. 894.]

This name, introduced in the U.S. Expl. Exped., vol. xii, p. 459, 1852, for *M. trapezina* Lamarek, must replace *Modiolarca* Gray, 1847, not *Modio-*

larca Gray, 1843. I have given full details concerning this alteration in the Proc. Mal. Soc. (Lond.), vol. xi, p. 173, 1914.

I doubt the identification of *trapezina* Lamarck from New Zealand, as Suter's measurements do not agree with typical specimens, whilst the specimens I collected at Cape Saunders are certainly not Gould's *pusillus*.

The genus is represented by six species, thus:—

- Gaimardia acrobetes* (Suter, 1913).
- *pusilla* (Gould, 1850)?
- *smithi* (Suter, 1913).
- *tasmanica* (Beddome, 1881).
- *trapezina* (Lamarck, 1836)?
- *minutissima* (Iredale, 1908).

Venericardia purpurata (Deshayes, 1854). [P. 905.]

Hedley (Zool. Res. "Endeavour," pt. i, 1911, p. 97) has drawn attention to the obscurity of *Venericardia australis* Lamarck, and recorded the omission from Neozelanic synonymy of *Cardita quoyi* Deshayes (Proc. Zool. Soc. (Lond.), 1852, p. 103, 1854), given to the Neozelanic shell described by Quoy and Gaimard under Lamarck's name, and which Deshayes determined as different from Lamarck's species. The above name, however, has priority, and has been adopted by Mr. E. A. Smith.

Venericardia lutea (Hutton, 1880). [P. 907.]

Venericardia zelandica Deshayes, 1854, cannot be retained, as it is based on *Cardita zelandica*, which has been used by Potiez and Michaud sixteen years earlier, as Suter himself points out. The above name was used by Hedley in his report on New Zealand bivalves dredged in 100 fathoms, as cited by Suter.

Venericardia unidentata (Basterot, 1825). [P. 908.]

In the synonymy of *Venericardia corbis* Philippi, 1836, is noted the above name without reference. I have traced this name, and it has priority as *Venericardia unidentata* Basterot, Mem. Soc. Hist. Nat., vol. ii, pt. i, 1825, p. 80.

As a subgeneric name, Suter has used *Miodontiscus* Dall, 1903. In the Proc. Mal. Soc. (Lond.), vol. xi, p. 177, 1914, I noted that apparently this should be replaced by *Coripia* De Gregorio, proposed for the present species. Dr. Dall has generously written me that I had overlooked his synonymizing of the latter name with *Pteromeris* Conrad, and his consideration of it as distinct from *Miodontiscus*. I must apologize for my oversight; but, in any case, it means the rejection of *Miodontiscus* in this connection, and I suggest the acceptance of *Coripia* De Gregorio given to this species in preference to Conrad's *Pteromeris*.

Condylocardia (Bernard, 1896). [P. 910.]

The original reference to this genus-name is incorrect. This genus was introduced in the Bull. Mus. d'Hist. Nat. (Paris), vol. ii, p. 195, 1896, and the first species, which in this case must be regarded as type, is *Condylocardia sanctipauli*, described on p. 196. The erroneous spelling given by Suter, "*pauliana*," is due to Dall at the first reference given.

On p. 196 of the same work both *Condylocardia crassicosta* and *C. concentrica* were described from Stewart Island. This number was received at the British Museum on the 10th November, 1896. On p. 194 *Hochstetteria costata*, and on p. 195 *Hochstetteria melcagrina*, are described from the same place. These pages should be added to the incomplete references given on pp. 857 and 859.

I think "St. Helena," given in the distribution of the genus, is incorrect.

Genus *Lucinida* (D'Orbigny, 1847). [P. 912.]

This name, proposed in the *Voy. Amér. Mérid. Moll.*, p. 588, 1847, with type designated as *Lucina cryptella* D'Orbigny, id. ib., must replace *Loripes*. This name is cited by Suter as of Cuvier, 1817; but it was used by Oken (*Lehrb. für Naturg.*, vol. iii, pt. i, p. 231, 1815) two years earlier, and it was originally used by Poli in the *Test. Siel.*, vol. i, *Introd.*, p. 31, 1795, as a genus-name for the animal of *Tellina lactea* Linné, while the shell was generically named *Loripoderma*. This peculiar double usage of two generic names—one for the animal, the other for the shell—has necessitated the rejection of the Polian names. I find that Dall accepted *Loripes*, and Suter's acceptance is due to his initiative, but in a parallel case Dall rejects *Callista* of Poli. I cannot see any other course open than the rejection of all of Poli's names; the acceptance would necessitate many unpleasant innovations.

Modiolarca minutissima Iredale. [P. 926.]

Omit this name from the synonymy of *Lasaea miliaris* Phil. My shell is a "*Modiolarca*," and a valid species, quite unlike any other member of the genus. I do not understand Suter's reference of it to *Lasaea*.

Kellia balaustina Gould, 1861. [P. 928.]

Omit this name and reference from the synonymy of *Lasaea scalaris* Philippi, 1847. Since Suter so placed it the type has been examined by Hedley, who has recorded (*Proc. Linn. Soc. N.S.W.*, vol. xxxviii, 1913, p. 268) that it is the species he had recently described as *Cyamionactra nitida* (*loc. cit.*, xxxiii, 1908, p. 477, pl. ix, figs. 19, 20), over which name it has, of course, priority, and has been brought into use.

Tellina liliana nom. nov. [P. 948.]

I propose this name for the New Zealand shell described by Quoy and Gaimard under the name *Tellina lactea*, which is invalidated by *Tellina lactea* Linné, *Syst. Nat.*, ed. x, p. 676, 1758. Suter has used *Tellina deltoidalis* Lamarek, proposed for an Australian shell, writing, "I have compared New Zealand and Australian specimens of the same size, and could not find the slightest difference between the two." Nevertheless, with long series the differences are well observed, and Mr. E. A. Smith, I.S.O., of the British Museum, the greatest British authority on bivalve molluscs, unhesitatingly separated the Australian from the Neozelanic species when recently he had occasion to investigate their nomination. He has not published his conclusions, but the shells are named and arranged in the British Museum collection under Lamarek's and Quoy and Gaimard's names.

Arcopagia disculus (Deshayes, 1855). [P. 951.]

The species of the group offer such well-marked features that *Arcopagia* needs generic distinction as above, and should not be submerged in *Tellina*. Hedley, whom I have already indicated as inclining to the use of genera of wide limits, has admitted (Proc. Linn. Soc. N.S.W., vol. xxxiv. pp. 433-34, 1909) *Arcopagia* generically.

Tellina gaimardi nom. nov. [P. 952.]

This name must replace *Tellina alba* Quoy and Gaimard, 1835, as there is a prior *Tellina alba* Martyn, Univ. Conch., vol. iv, fig. 157, 1787. All the specimens in the British Museum have been named as above for the last fifty years, but I have been unable to trace this name in literature. Bertin (Nouv. Arch. Mus. d'Hist. Nat. Paris, 2nd ser., vol. i, p. 285, 1878) states that Quoy and Gaimard's type came from New Ireland; but this is obviously an error for New Zealand, as that locality is given by the authors.

Macoma edgari nom. nov. [P. 953.]

Tellina glabrella Deshayes, 1855, was anticipated in usage by Chiaje (Mem. Anim. s. Vert. Napoli, tab. pro. v and vi, 1830, pl. 82), and I propose to rename it as above. The reference to the genus *Macoma* is due to the fact that on the back of the type-tablet Mr. E. A. Smith has noted that the shell must be there placed.

Leptomya perconfusa nom. nov. [P. 956.]

When Mr. E. A. Smith, on Suter's inquiry, showed the shell known to Neozelanic workers as *Tellina strangei* had been incorrectly identified, and was a member of the genus *Leptomya*. Mr. Suter adopted Hutton's specific name from *Tellina linea*. But that combination had been utilized many years before Hutton chose it by Conrad in the Journ. Ac. Nat. Sci. Philad., 1st ser., vol. i, p. 259, 1837. Instead of Hutton's name, I propose the above as a suitable cognomen.

Fam. Amphidesmatidae Iredale. [P. 956.]

I have found no worse confusion than in the present group called the family *Mesodesmatidae* by Suter, following Dall. Unfortunately, an early error having crept into Dall's researches, the whole matter must be reviewed, and this review has necessitated considerable rearrangement.

Mesodesma was introduced by Deshayes in the Ency. Meth. Vers., vol. ii, p. 441, the title-page of the volume bearing the date 1830; but Sherborn and Woodward (Ann. Mag. Nat. Hist., 7th ser., vol. xvii, p. 579, 1906) have shown that the page quoted was not published until 1832. Seven species are listed, the names and localities being,—

- P. 442: *M. donacina* ex Lamarck. New Zealand (Q. & G.).
 P. 443: *M. chemnitzii* nov. for Chen. 6, 3, figs. 19, 20. Indian Ocean.
M. quoyi nov. New Zealand (Q. & G.).
M. striata ex Linné. New Holland.
 P. 444: *M. donacilla* ex Lamarck. Mediterranean.
M. gaimardi nov. New Zealand (Q. & G.).
M. trigona nov. Praslin Harbour, New Holland.

Deshayes indicated that his genus was proposed for the one Lamarck had designated "*Donacille*" in 1812, but which that author had submerged in *Amphidesma* in 1818. Lamarck, in the Extra. d'un Cours. Hist. Nat., p. 107, 1812, named "*Donacille*," but no definition was given and no Latin name, only the vernacular appearing as a *nomen nudum*. In the Hist. Nat. Anim. s. Vert., vol. v, p. 489, July, 1818, the genus *Amphidesma* is proposed by Lamarck, with the explanation, "Depuis assez long-temps, j'avais établi ce genre dans mes cours, sous le nom de donacille (extrait du cours, etc., p. 107), parce que l'espèce que je connus d'abord avait l'aspect d'une donace." The first species is *A. variegata*, the second *A. donacilla*, proposed for *Mactra cornea* Poli, Test. 2, tab. 19, figs. 9-11.

From the preceding it is clear that the name *Amphidesma* was simply substituted for *Donacille*, which was only rejected through its inapplicability to all the species admitted into the genus later. The type of *Amphidesma* must, by tautonymy, be regarded as *A. donacilla*, and this name would come into use vice *Mesodesma*. The earliest latinization of *Donacille* I have traced is in the Dict. Sci. Nat., vol. xiii, p. 428, 1819, where is written, "DONACILLE. *Donacilla* (Conchyl.) M. de Lamarck, dans l'extrait de son Cours, etc., pag. 107, avait donné ce nom de genre à une coquille bivalve, ayant l'aspect d'une donace, qu'il a fait entrer depuis dans le genre qu'il a nommé *Amphidesme*. Hist. Nat. des Anim. sans Vert., 2^e édit., t. 5, p. 489. (De B.)."

In the Gen. Rec. Moll., vol. ii, p. 114, March, 1857, as a synonym of *Donacilla* Lamarck is noted "*Donacina* Blainv." Reference to Scudder's Nomenclator, p. 103, gave "*Donacina* Blainv., Moll. 1818, S." The S. means that the name is one added in the supplemental list. On p. 113 of that list I find "*Donacina* Blainville, Dict. Sci. Nat., x, p. 216 (err. typ. ? = *Donacilla* ?), 1818. Moll. Biv." No name at the end of this entry means that Scudder himself was responsible for his addition. I may have been unfortunate, but I have noted that many of Scudder's own entries were erroneous, and reference to the place given shows no mention of anything to do with *Donacina*. So far, the only reference in connection with the name I have found in the Dict. Sci. Nat. is the one given above.

In the Zool. Voy. "Coquille," vol. ii, pt. i, p. 424, 1831, Lesson proposed the new generic name *Paphies*, a contraction for *Paphioides*, as shown by the vernacular, for the Neozelanic shell "*Mya novaezeelandiae* Chemnitz."

My proposition to use *Amphidesma* is based on the fact that the name *Paphies* has priority over *Mesodesma*, and has exactly the same type, for, though Deshayes fixed no type of his genus, Herrmannsen selected (Index Moll., vol. ii, p. 40, 1847) *Mya novaezeelandiae* Chemn. as type, and there is no valid objection to this type-designation. Thus, in any case, *Mesodesma* passes into absolute synonymy.

Taria was proposed by Gray in the Ann. Mag. Nat. Hist., 2nd ser., vol. xi, p. 41, 1853, for *Taria stokesii* n.s. This is a *nomen nudum*, and as type of *Taria* Suter gives *Mesodesma ventricosum* Gray: but in the same place Gray placed his own *ventricosa* in *Paphia*. As two species have been confused, it was necessary to find out what *T. stokesii* was. Search in the British Museum collection, when I was greatly assisted by Mr. E. A. Smith, resulted in the recognition of the type-tablet. The specimen proved somewhat abnormal, but undoubtedly referable to *ventricosa*, which name it bore, and as which it had been recognized by Gray himself; hence its non-publication.

No other names concern us at the present as regards the higher groupings of the Neozelanic shells.

The nomination of the species and groups would read,--

Genus AMPHIDESMA Lamarck, 1818. *Amphidesma* Lamarck, Hist. Nat. Anim. s. Vert., vol. v, p. 489, 1818. Type (by tautonymy): *A. donacilla* Lamarck.

Subgenus *Taria* Gray, 1853.

Amphidesma gaymardi (Deshayes, 1832). Synonyms: *Mesodesma subtriangulata* Griffiths and Pidgeon, 1834; *M. spissa* Reeve, 1854.

— *quoyi* (Deshayes, 1832). Synonym: *Mesodesma lata* Deshayes, 1843.

— *ventricosum* Gray, 1843. Synonym: *Taria stokesii* Gray, 1853, n.n.

Subgenus *Paphies* Lesson, 1831. Synonym: *Mesodesma* Deshayes 1832. *Amphidesma australe* Gmelin, 1791.

— — — var. *aucklandicum* Martens, 1879.

Amphidesma gaymardi (Deshayes, 1832). [P. 957.]

This is the name to be used for the species included by Suter as *Mesodesma subtriangulatum* Gray, 1825.

First, "*Erycina subtriangulata* Gray, Thomson's Ann. Philos., xxv, 1825," does not occur. Observe that no page is given. In the Ann. Philos. (Thomson), vol. xxv, also quoted in n.s., vol. ix, 1825, Gray gave a list of species not noticed by Lamarck, and on p. 135 is "*Ery(cina) subangulata. Crassatella cincta* Lam., 483?" Note the spelling of the specific name, and, as the above is the complete entry, it is quite obvious that it is a *nomen nudum*. The first synonym, "*Mesodesma latum* Deshayes, 1843," does not belong here: the figure negatives the association instantly. Deshayes wrote "*lata*." Meanwhile, in Griffith and Pidgeon's "Cuvier's Animal Kingdom," on pl. 22, fig. 4, a shell was figured under the name *Mesodesma subtriangulata*. Suter has placed this entry in the synonymy of *Mesodesma australe* Gmelin, 1790, writing, "not of Gray, 1825." I know Suter has never seen this plate, as the figure in no way resembles *Mesodesma australe*. The figure shows a shell quite like the present species, and, allowing for faulty draughtsmanship, is a fairly good illustration. The shell from which the drawing is supposed to have been made, the name being written on the back of the tablet, is still preserved in the British Museum, and is undoubtedly this species. However, in the Ency. Meth. Vers., vol. ii, p. 444, 1832, Deshayes named and fully described *Mesodesma gaymardi* from a specimen brought back from New Zealand by Quoy and Gaimard. In my opinion, no name could be more suitable. I have associated this species with *ventricosum* Deshayes in the subgenus *Taria*, as superficially there does not seem much distinction. Comparing *A. quoyi* (Deshayes) with the present species, I note that both have the siphonal inflection small, whereas *A. ventricosum* has the siphonal inflection deep. Suter, in his definition of *Taria*, copied from Dall, writes, "pallial sinus well marked, sometimes deep." The type of *Amphidesma*, though approaching this species *A. gaymardi*, has a long siphonal inflection, so that it seems a variable character.*

* I find Lamy (Bull. Mus. Hist. Nat. (Paris), vol. xviii, 1912, has investigated the nomenclature of the Neozelanic forms, and has shown that *Mesodesma lata* Deshayes, 1843 = *M. quoyi* Deshayes, 1830, and that this is quite distinct from *M. ventricosa* Gray. My own results were achieved in ignorance of Lamy's prior work, so that my confirmation is pleasing. Lamy has also gone further than myself with regard to the present species, as he has shown that *subtriangulata* can be retained as of Wood: Index Test. Suppl., pl. i, fig. 10, 1828 (*Mactra*).

The three species *A. gaimardi*, *A. quoyi*, and *A. ventricosum* are associated together under the subgenus *Taria* in the British Museum.

Amphidesma quoyi (Deshayes, 1832). [P. 958.]

Add: *Mesodesma quoyi* Deshayes, Eney. Meth. Vers., vol. ii, p. 443, 1832; *M. lata* Deshayes in Guérin's Mag. Zool. Moll., 1843, pl. 80.

This distinct species is confused in Suter's description of *Mesodesma ventricosum*, while the second name is placed in the synonymy of Suter's *Mesodesma subtriangulatum*. Dall wrote that he could not trace the first name, though it occurred in the same place as the genus-name which he quoted as having referred to! The description given is good, and the words "l'impression du rétracteur des siphons est très-courte" fixes the identity of the species later figured by Deshayes as *M. lata*. Many specimens are here collected by Bolten, Stokes, &c.: they are all named "*lata*," as distinct from "*ventricosa*," which they superficially resemble in size and shape. *A. ventricosa* Gray is longer and narrower than *A. quoyi* Deshayes, and approaches *A. gaimardi* in shape. *A. quoyi* Deshayes has the posterior slope flattened, while in *A. ventricosa* the posterior slope is bicarinate. In *A. quoyi* Deshayes the siphonal inflection is not deep, whilst in *A. ventricosa* Gray it is very deep. Suter, in his definition of *Taria* (p. 958), writes, "pallial sinus well marked, sometimes deep"; but in the species "*M. ventricosum*" he only describes the latter case. Otherwise his description seems to apply to both species, as he does not mention the bicarinate posterior slope, which is distinctly marked in true "*ventricosa*."

A. quoyi Deshayes would enter the same subgenus as *A. gaimardi* Deshayes, but there does not superficially seem subgeneric distinction between these and *A. ventricosum*, the deeper siphonal inflection being the most marked feature.

Fam. Veneridae Leach. [P. 975.]

In this family the nomenclature is that proposed by Dall. This remark refers, of course, to the nomination of the higher groups only. Jukes-Browne, just before his death, completed a synopsis of the family, based upon and severely criticizing Dall's work. This appeared in the Proc. Mal. Soc. (Lond.), vol. xi, pp. 58-94, 1914, and, as this is not generally accessible to the Neozelanic student, I here give a sketch as far as it concerns Neozelanic forms. I would point out that Jukes-Browne's work cannot be accepted *in toto*. Nevertheless, it is possible that a study of Jukes-Browne's papers in conjunction with Dall's results will show that some of the former's corrections are necessary. As, however, Jukes-Browne was dependent upon second-hand information for much of his data, and did not commonly use a microscope, there is still much to be done in connection with these shells. I have given Jukes-Browne's classification, so that comparison can be instituted, and that the New-Zealander may be aware that there has been diversity of opinion regarding the grouping of these shells. Jukes-Browne's system would therefore read:—

Family VENERIDAE.

Genus CALLISTA Mörch (after Poli).

Callista multistriata (Sowerby, 1851).

Genus DOSINIA Scopoli, 1777.

Section *Austrodosinia* Dall, 1902.

Dosinia anus (Philippi, 1848).

Family VENERIDAE—continued.

Genus DOSINIA—continued.

Section *Phacosoma* Jukes-Browne.

Dosinia caerulea (Reeve, 1850).

— *subrosea* (Gray, 1835).

Genus ANTIGONA Schumacher, 1817.

Subgenus *Clausina* Brown, 1827.

Section *Ventricola* Römer.

Antigona oblonga Hanley, 18—.

Genus VENUS Linné, 1758.

Subgenus *Chione* Megerle, 1811.

Section *Chione* s. str.

Venus stutchburyi Gray, 1828.

Subgenus *Clausinella* Gray

Section *Chamelea* Mörch, 1853.

Venus crassa Quoy and Gaimard, 1835.

Subgenus *Salacia* Jukes-Browne, 1914.

Venus lamellata Lamarck, 1818.

— *yatei* Gray, 1835.

Genus PROTOTHACA Dall.

Subgenus *Protothaca* s. str.

Protothaca costata Quoy and Gaimard, 1835.

Genus GOMPHINA Mörch, 1853.

Gomphina maorum E. A. Smith, 1902.

Genus TAPES Megerle, 1811.

Subgenus *Amygdala* Römer, 1864.

Tapes intermedia (Quoy and Gaimard, 1835).

Genus VENERUPIS Lamarck, 1818.

Subgenus *Venerupis* s. str.

Venerupis elegans Deshayes, 1854.

Subgenus *Pullastra* Sowerby, 1826.

Venerupis fabagella (Deshayes, 1854).

— *siliqua* Deshayes, 1854.

The most casual glance will show the discord between the two classifications, and I propose only to note the few errors I have observed with regard to the nomenclature adopted by both. Firstly, Jukes-Browne had not studied some New Zealand species, so that I cannot indicate the positions assigned to every New Zealand Venerid. Secondly, he has rejected Bolten's generic names, and abrogated the law of priority when convenient to his desires.

The co-ordination of the two systems as applied to Neozelanic forms, taking Suter's association of species as approximately correct, and making the necessary alterations in the nomenclature, would read thus:—

Genus DOSINIA Scopoli, 1777.

Section *Dosinia* s. str.

Dosinia lambata (Gould, 1850).

Section *Dosinorbis* Dall, 1902 = *Phacosoma* Jukes-Browne, 1914.

Dosinia caerulea (Reeve, 1850).

— *subrosea* (Gray, 1835).

Section *Austrodosinia* Dall, 1902.

Dosinia anus (Philippi, 1848).

Section *Dosinisca* Dall, 1902.

Dosinia greyi Zittel, 1864.

- Genus *MACROCALLISTA* Meek, 1876.
Macrocallista multistriata (Sowerby, 1851).
- Genus *ANTIGONA* Schumacher, 1817.
 Subgenus *Clausina* Brown, 1827.
 Section *Ventricola* Römer.
Antigona creba (Hutton, 1873).
 ——— *z landica* (Gray, 1835).
 ——— *subsulcata* (Suter, 1905).
- Genus *CHIONE* Megerle, 1811.
 Subgenus *Chione* s. str.
Chione stutchburyi Wood, 1828.
 Subgenus *Clausinella* Gray.
 Section *Chamelea* Mörch, 1853.
Chione spissa (Deshayes, 1835).
 ——— *mesodesma* (Quoy and Gaimard, 1835).
- Genus *SALACIA* Jukes-Browne, 1914.
Salacia disjecta (Perry, 1811).
 ——— *yatei* (Gray, 1835).
- Genus *GOMPHINA* Mörch, 1853.
Gomphina maoram E. A. Smith, 1902.
- Genus *PROTOTHACA* Dall, 1902.
Protothaca crassicosta (Deshayes, 1835).
- Genus *PAPHIA* Bolten, 1793.
 Subgenus *Ruditapes* Chiamenti, 1900.
Paphia intermedia (Quoy and Gaimard, 1835).
 ——— *fabagella* (Deshayes, 1854).
- Genus *VENERUPIS* Lamarek, 1818.
Venerupis elegans Deshayes, 1854.
 ——— *reflexa* Gray, 1843.
 ——— *siliqua* Deshayes, 1854.

I give notes with regard to the emendations proposed, but, as I have not thoroughly studied these shells, the grouping of species is based upon Suter's interpretation of Dall's results. I have, of course, critically examined all the species and the nomination, but more than that is necessary in a difficult group such as this.

Orbiculus (Megerle, 1811). [P. 977.]

This is sectionally used for the species *Dosinia caerulea* (Reeve, 1850), but I have dispensed with it altogether, placing that species under *Dosinorbis* Dall, 1902, of which *Phacosoma* Jukes-Browne, 1914, upon the latter's own premises, must be considered a synonym. He argued that *Dosinorbis* was superfluous, as the characters given by Dall were of little value; he then proposed *Phacosoma* for a well-marked group, and referred the type of *Dosinorbis* to his section. Further, *Pectunculus* Da Costa, 1778, antedates, and is equivalent to *Orbiculus* Megerle, 1811, according to Jukes-Browne and Dall.

Dosinia caerulea (Reeve, 1850). [P. 977.]

As synonyms, Hedley (Proc. Linn. Soc. N.S.W., vol. xxxviii, p. 269, 1913), from examination of types, records *Dosinia diana* A. Adams and Angas, Proc. Zool. Soc. (Lond.), 1863, p. 424; and *Dosinia cydippe* Adams, Proc. Zool. Soc. (Lond.), 1855, p. 224 (1856).

Dosinia subrosea (Gray, 1835). [P. 979.]

As synonyms, Hedley (loc. cit., p. 270) has added *Dosinia coryne* A. Adams, Proc. Zool. Soc. (Lond.), 1855, p. 223 (1856); *D. crocea* Deshayes.

Genus *Antigona* (Schumacher, 1817). [P. 983.]

I have recorded (Proc. Zool. Soc. (Lond.), 1914, p. 668) that when Dall revived *Cytherea* of Bolten, 1798, for this genus he overlooked the fact that it was invalid, as there was a *Cytherea* Fabricius, 1794. I added, *Antigona* was older than *Antigonus* Hübner, quoted as of 1816, but not published until 1820, and therefore the correct name, providing that the other data recorded by Dall and Jukes-Browne and their conclusions were accurate.

I doubt the reference of the Neozelanic shell *Dosina zelandica* Gray to this genus.

Antigona zelandica (Gray, 1835). [P. 985.]

As the basis of *Cytherea oblonga*, Suter has given "*Venus oblonga* Hanley in Wood's Index Test., Suppl., 1828." Wood's Index Test., Suppl., was published in 1828, but Hanley's Descr. Cat. Rec. Shells, also described as a 2nd edition of Wood's Index Test., did not appear until 1842, and was not completed until 1856. On Hanley's Supp., pl. xvi, fig. 1, "*Venus oblonga* Hanley (*Dosina o.* Gray)" was given: this plate was published in 1844. In 1856 the text to this appeared, and on p. 359 *Venus oblonga* Hanley is described. This is simply *Dosina oblonga* Gray, 1843, placed in the genus *Venus*, and as a synonym is quoted "*Dosina zelandica* Gray, 1835, fide Deshayes."

In the Appendix to Yate's Acc. New Zeal., p. 309, Gray describes some new species of shells, one of which was *Dosina zelandica*. The preface to this work is dated the 10th August, 1835. This name has priority, and must now be used. It was dropped on account of the reference of all the species to *Venus* when it clashed with *Venus zelandica* Quoy and Gaimard, published in the same year as Gray's name but earlier. As, however, both were introduced as belonging to different genera, and both are still recognized as referable to distinct genera, both names must be maintained.

When Gray introduced his species he added, "The *Dosinae* have a small anterior additional tooth on the hinge margin. Lamarek refers them to *Venus*: they are intermediate between *Venus* and *Cytherea*." This is the first introduction of the genus-name *Dosina*, and by monotypy it becomes the type. The name is over twenty years older than *Ventricola* Römer, 1857, used for this section by Jukes-Browne, but cannot be used on account of the prior *Dosinia* Scopoli, 1777. *Dosina* Gray has been generally cited as of 1838, and a different type noted.

Chione spissa (Deshayes, 1835). [P. 991.]

Venus crassa Quoy and Gaimard, 1835, is antedated by *Venus crassa* Gmelin, Syst. Nat., 1791, p. 3288.

Suter's first synonym reads, "*V. spissa*, Deshayes A.S.V., ed. 2, vi, 373 (misprint for *crassa*)." Investigation of this name has given extraordinary results. Reference to Deshayes shows that he was not aware of the specific name given by Quoy and Gaimard, but that he described the shell from the figure given in the "Astrolabe Atlas," and simply translated the vernacular there added. The title-page of the atlas is dated 1833, which indicates that the plates were issued before the text, as that is dated 1835. The vernacular on the plate is *Venus épaisse*, and this Deshayes

translated as *Venus spissa*, and quoted it as of Quoy. When the text was issued, however, Quoy and Gaimard had used *crassa*, both this word and *spissa* being Latin words of similar meanings.

As Quoy and Gaimard's name proves to be invalid, Deshayes's alternative comes into use. The extraordinary part now comes to be related. The last page of Quoy's work bears the date 17th March, 1835, so that it could not have been published before that date. The preface to Deshayes's book is dated the 22nd February, 1835, and, according to the Bibliog. France, it was published before the 7th March, 1835. This gives clear priority to Deshayes's name, and proves that this should have been in use all the time, and, further, that Deshayes's name could not possibly have been a misprint.

Mr. E. A. Smith, I.S.O., of the British Museum, states that he is still unable to separate this species from *C. mesodesma* (Quoy and Gaimard, 1835), which Suter has maintained as a distinct species. If this conclusion, which is justified by the material here, be again confirmed, the name to be used for the combination is *Chione spissa* Deshayes, as shown above.

Hedley (Zool. Res. Fish. Exp. "Endeavour," pt. i, p. 100, 1911) has recorded *Chione mesodesma* (Quoy and Gaimard) for South Australia, noting it as common in Tasmania, and Gatliff and Gabriel and May have also noted its occurrence in Australian waters. "*Venus spurca* Sowerby, P.Z.S., 1835, 23," included in the synonymy by Suter, was not published until April, 1835.

As a subspecies, *violacea* (Quoy and Gaimard, 1835) is admitted by Suter. The name is invalid, as Gmelin had proposed this in the Syst. Nat., 1791, p. 3288. I do not, however, think it worth while to provide a new name for such a slight variation.

With regard to the variation, it would be interesting if Hedley, May, or Gabriel would investigate the matter as regards Australia, and record whether the same variation is observed there as Suter has admitted in New Zealand, and settle the usage of *spissa* or the distinction of *mesodesma*.

Protothaca crassicosta (Deshayes, 1835). [P. 996.]

Venus crassicosta Deshayes, Anim. s. Vert., ed. 2, vol. vi, p. 373, 1835, has priority over *Venus costata* Quoy and Gaimard, 1835, which is, moreover, preoccupied by Gmelin (Syst. Nat., 1791, p. 329). This is an absolutely parallel case, as regards nomination, with the preceding, the details being identical.

Suter has omitted the reference to Deshayes, quoting this name as of Hanley; the date 1844 should be added to the reference.

I have followed Jukes-Browne in giving *Protothaca* generic rank. It will be noted that Suter now classes the species in *Paphia* (= *Tapes*), whilst he formerly placed it in *Chione*. When collecting I was puzzled at its inclusion in *Chione*, as in appearance and habits it recalled *Paphia*, and disagreed with *Chione*.

The acceptance of *Protothaca* as a genus seems to satisfy this shell in the best manner.

Genus *Gari* (Schumacher, 1817). [P. 1002.]

I have been unable to trace a valid reason for the rejection of this name in favour of the later *Psammobia* Lamarek, 1818. *Gari* was proposed by Schumacher (Ess. Nouv. Syst. Test., pp. 44, 131, pl. ix, fig. 2). The type must be *Gari vulgaris* = *Tellina gari* Linné, and this is undoubtedly a

member of this genus. *Gari* has long been used by British malacologists, and probably has been rejected by Austral-Neozelanic workers through the influence of Dall's writings. Under the present nomenclatural laws I am unable to find any cause for its non-acceptance.

I would suggest that possibly the typical species of *Gari* may prove generically separable from species of *Psammobia*, and both may later be preserved; but on the present basis and facts *Gari* claims recognition, and *Psammobia* must pass into disuse generically as a synonym of *Gari*.

Genus *Cleidotherus* (Stutchbury, 1830). [P. 1033.]

When Stutchbury proposed the above genus-name (Zool. Journ., vol. v, 1830, p. 97) for the species *C. chamoides* (p. 98, Tab. Suppl., xlii, figs. 5-8), from Port Jackson, he gave a footnote reading, "Since this article was sent to press, it has been ascertained that De Roissy has named and characterized this remarkable genus, though evidently from incomplete specimens. He has called it in French '*Camostrée*,' a name so entirely inapplicable that I hesitate not to retain the appellation of *Cleidotherus*, by which I had designated it. There is nothing in the shell to connect it with *Ostrea*." Reference to the place given by Suter as the introduction of *Chamostrea*—viz., Blainville (Man. de Malac., 1825, p. 632)—shows this to be the introduction noted by Stutchbury of "*Camostrée* de Roissy" only, no Latin name being proposed.

Stutchbury's genus-name must therefore come into use, as *Chamostrea* was not validly proposed until a much later date