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PHILIP PEARSALL CARPENTER (1819-1877)

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*The Geological Society of America*  
*Memoir 76*

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TYPE SPECIMENS OF  
MARINE MOLLUSCA  
DESCRIBED BY  
P. P. CARPENTER FROM  
THE WEST COAST  
(San Diego to British Columbia)

BY  
KATHERINE VAN WINKLE PALMER

*Paleontological Research Institution*  
*Ithaca, New York*



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The photograph of Philip Carpenter (frontispiece) is a copy of an enlarged one in the Redpath Museum. A similar photo is in the Mollusca Division, Museum of Comparative Zoology ; two other pictures of Carpenter are in the latter institution. The writer wishes to thank the authorities of both institutions for the privilege of having copies made.

The librarian of the University of California also allowed a microfilm made of the manuscript of West Coast conchology by J. G. Cooper which is in the library of the University of California.

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## ABSTRACT

Philip P. Carpenter ranks next to W. H. Dall and Paul Bartsch in the number of marine molluscan species described from the West Coast, San Diego to British Columbia. More than 270 Carpenter species, fossil and Recent, and many more names are involved in the present study. Illustrations of more than 190 types and of many original specimens with pertinent data are included. Only 4 of about 50 pelecypod species and only about one-fifth of the types of the gastropods have had the types figured previously. Authentic whereabouts of the types have been determined, lists regarding depositories of types, type localities, evaluation of names, analysis of available Carpenter material, and historical background have been included. Because Carpenter was one of the important figures in early American conchology, the historical background presents a partial picture of that time (*ca.* 1841-1870). The fossil distribution of each Recent species where known is included. A stratigraphic distributional chart is inserted. This reveals the relationship between the fauna of the Miocene, Pliocene, Pleistocene, and Recent species of the area studied. The importance of the illustration of the large number of heretofore unfigured types of common species, fossil and Recent, may be reflected in more refined taxonomic, ecological and paleoecological, statistical, and distributional studies of the late Cenozoic mollusks.





## INTRODUCTION

### PURPOSE

Those who are familiar with the marine molluscan fauna of the West Coast do not need an explanation for placing on record, for the first time in most cases, the figures of Carpenter's types. For the benefit of those less well acquainted, the following facts may give a brief resumé of the problem involved.

The area of the species under discussion is confined to the West Coast of the United States from San Diego northward. It is the province covered by Dall in U. S. National Museum Bulletin (1921) No. 112 and that of the lists appearing in the Minutes of the Conchological Club of Southern California. Those lists make a convenient accompanying guide. Such a unit excludes those species described by Carpenter from south of San Diego, except where they range into the northern province. The southern areas from Panama north deserve a separate publication or publications. Illustrations and data have been accumulated with this in mind. Carpenter's Mazatlan Catalogue (1857) is a work unto itself and would be best illustrated with a series of plates to accompany the already printed text. The types of the species described in that catalogue are in the British Museum (Natural History). Because of the magnitude of the problem it appeared proper to limit the area involved so that the major portion of the whole project could be completed in a reasonable length of time.

Of 496 species of pelecypods in the region involved (the number which Dall compiled up to 1921 in Bulletin 112), nearly half were described by Dall. Carpenter described about 50 species or nearly one-tenth of the total number. Conrad is the only other worker who described a number (about 45<sup>1</sup>) comparable to that of Carpenter. Dall<sup>2</sup> is the author of about half of the specific names of gastropods which he recorded from the same area, and Bartsch is the author of less than one-fifth of the same number. Carpenter ranks next in importance with about 176 species. No other person is credited with authorship of more than 40 species.

There are approximately 270 species (including those of Carpenter and others) and many more names involved in the present study. Only 4 of the 50 pelecypod species described by Carpenter have had the types figured, and some of these figures are not adequate. Of about 176 gastropod species concerned probably only about one-fifth have had the types illustrated. Because of the extensive monographic work of Pilsbry and early efforts of Dall, the Amphineura described by Carpenter, either published or in manuscript, have been generally illustrated. Further discussion in regard to the chitons will be given under that group.

The conspicuous lack of illustrations of the Carpenter types has been a stumbling block to the identification and interpretation of the many Carpenter species. Philip Carpenter described more than 500 new species and published

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<sup>1</sup> Figures, except those of Carpenter, derived by count in Bulletin 112.

<sup>2</sup> Including species of joint authorship with Bartsch. The same species are also counted under Bartsch authorship.

voluminous notes, yet only two of his papers include illustrations, and only one new species was figured by him, except for sectional drawings of several new species. The absence of figures in Carpenter's works has been a source of criticism of otherwise exceedingly deserving efforts. Less careful and less brilliant conchologists of his day have not been so severely judged, for they included illustrations in their works.

The chiton manuscript which was not complete at the time of Carpenter's death did contain the series of drawings which had been executed under Carpenter's supervision. Those drawings were deposited in the Smithsonian Institution, where fortunately the illustrations were available to Pilsbry, and many were published in his chiton monographs. These manuscript illustrations, as well as a series of drawings of the species of the Mazatlan Catalogue, are preserved in the archives of the United States National Museum. Some of the drawings were published by Dall and Bartsch. Letters in the files of the Redpath Museum reveal that Carpenter was concerned over the illustration of the West Coast fauna and that he and J. D. Whitney of the Geological Survey of California were negotiating in 1871 plans for drawings for a West Coast conchological publication. Carpenter's death and the vicissitudes of the California Survey prevented such a fundamental project from being completed.

The second detrimental factor involved in the problem of the identification of species described by Carpenter from the West Coast has been misinformation and lack of information regarding the types.

It has been assumed by many workers that Carpenter did not designate types and that most of the specimens have been lost. Neither of these assumptions is correct. An examination of Carpenter's original collections with original labels intact shows that type designations are marked; some specimens are labelled "unique type." In many cases no holotype is designated, but several syntypes are stipulated as types. The writer has included under discussion of the types in each species the quotation of the label. This in many instances may be tied into the data as given in the original description. Unfortunately, in some cases more than one locality is included on the type label. One cannot, therefore, differentiate which specimens belong to the respective localities. Duplicate sets of types have been discovered in the U. S. National Museum and the Redpath Museum. Frequently Carpenter's use of the word type would be equivalent to what modern authors term paratype. Although the collection at the Redpath Museum has remained intact since Carpenter's death, material at other institutions has been moved or rearranged. Hence, there could have been mixtures, and there has been loss of specimens.

Carpenter had access to large collections on both sides of the Atlantic as well as the accumulation of an extensive one of his own. He received by gift or exchange shells from chief collectors of his day, including such men as Cuming, Pease, Mörch, Jeffreys, Tristram, M'Andrew, Henry Adams, Jewett, Newcomb, Cooper, Gould, Stearns, Gabb, Dall, Hemphill, and others. He identified the collections for the Smithsonian Institution at the headquarters and abroad, where the bulk of the shell collections were shipped to him. After he was established in

Montreal and affiliated with McGill University, his conchological studies continued. Besides that bequeathed to McGill, collections were set him by the Smithsonian Institution, the Geological Survey of California, the Boston Society of Natural History, and individuals who wished the benefit of his wide experience. It is consistent, then, that specimens which he used as the basis of the description of new species might be scattered when his death occurred in the midst of such activity. As can be seen from the itemized list of type depositories included herein, the greater number of Carpenter types are in the United States National Museum and the Redpath Museum. To avoid further confusion attention must be called to the fact that Mrs. Oldroyd in her worthy manual (1924–1927) based the listing of many type depositories on false assumptions. In addition, she used the original statement of the location of types as basis for actual location at the time of her writing. In many cases the two are not the same. Such statements in Oldroyd as “Mrs. Boyce of Utica, New York” (continued by Soot-Ryen, 1955, p. 62) and the “California Geological Survey” are particularly misleading and cause a great deal of unnecessary searching. In both cases the specimens at the time of Carpenter’s description belonged in such categories, but through unaccountable changes such statements mean little or nothing in regard to the present whereabouts of the specimens. Mrs. Boyce was Colonel Jewett’s daughter, and none of her collection exists in Utica today. Most of the specimens of the “California Geological Survey” which might be identified with the above are in the United States National Museum. Some are in the Museum of Paleontology, University of California.

The chief purpose of this report has been, therefore, to investigate, locate, and illustrate the types of the marine molluscan West Coast species described by Philip Pearsall Carpenter and to bring the data together to form a foundation on which researchers on the fauna can evaluate the original data in the light of more extensive information.

In this report concentration on the study of the types of Carpenter’s marine molluscan species does not mean that the author regards the principle of the establishment of types as an end in systematics. It is only a means and a tool in taxonomy and an aid in refined methods of biological analysis of organisms. It is, however, a necessary implement, as is any original work, in the determination of taxonomic names. There are many examples shown in this paper where considerable writing and energy could have been saved if all the original data in the problem had been available—for example, in *Arca pernoidea* vs. *A. bailyi*. In some cases nude names have been carried in lists, and one or more generic names applied to the same species. Obviously any statistics based on such data would be of little value. An extreme case of that point is that of *Alvania aequisculpta* “Cpr” [Keep] given in the same list under three generic names.

Schenck (1945, p. 518, 519) enumerated similar examples and pointed out the kind of taxonomic data needed for biometrical analysis of molluscan assemblages. It is the purpose of this report to provide such data, particularly the too long-delayed illustration of the Carpenter types.

The writer has not pretended herein to make specific discriminations which must be based on large collections of the forms from the West Coast. Such work must be done by those who are situated in the area or have available the proper material. It has been the plan herein to make available to those distant workers the facts which are not accessible to them.

### PREPARATION

In 1921 when arranging collections in Paleontological Laboratory of Cornell University the writer discovered two of Carpenter's lost molluscan types from the Pleistocene inland from Santa Barbara (Van Winkle, 1921, p. 1-5, Pl. 15, figs. 6-11). These were in the scattered material of the Jewett Collection which Ezra Cornell purchased about 1865.

Twenty-three years later 93 Carpenter "types" were located (Palmer, 1945, p. 97-102) in the Peter Redpath Museum, McGill University, Montreal, Canada. The whereabouts of those types were previously unknown. Details of the Carpenter shell collection in the Redpath Museum are given below under that heading. Photographic negatives were made of the specimens in the Zoology Department at McGill by J. W. Pollack, and the prints later finished by the writer.

A grant (No. 788) in 1945 from the American Philosophical Society (Palmer, 1946, p. 122-133) provided aid for the search of the remainder of the material; two additional trips to McGill were included, and more types were found. Before 1946, examinations also had been made in the Redpath Museum, in the Academy of Natural Sciences in Philadelphia, American Museum of Natural History, New York State Museum, Museum of Comparative Zoölogy at Harvard University, Cornell University, and the Division of Mollusca, United States National Museum.

Inquiries to the Department of Geology, Stanford University, and the Department of Paleontology, California Academy of Sciences, San Francisco, California, revealed that no Carpenter types existed there. Four trips were made to the Division of Mollusca, United States National Museum, where the greatest number of types are preserved. Examination, notes, and checking were accomplished, and the specimens were photographed by the museum's photographic staff.

The search for and verification of the existence of types in the Gould Collection at the New York State Museum in Albany was facilitated by the employment of the author as temporary expert in zoology during 1945-1946. This allowed a first-hand examination of the extensive molluscan collection of that organization. A catalogue of the first duplicate series of the Reigen Collection of Mazatlan shells was published as a result of part of the work (Palmer, 1951).

At the request of Dr. Harald Rehder a paper entitled "Illustrations of Carpenter West Coast Molluscan Types" was read before the American Malacological Union on August 15, 1946.

A visit was made to the Redpath Museum in the spring of 1949 for the examination and photographing of types which had been found subsequently and to check queries concerning previous notes.

Through the generosity of Mr. Lovell G. Mickles of Montreal, the molluscan collections of the Redpath Museum were reorganized in 1950–1951. The work was directed by the author, assisted by Vicenté Condé of Cuba. This allowed further examination of the Carpenter Collection, and more types and pertinent specimens were discovered.

Examination was made in 1951 of collections in the Chicago Museum of Natural History and the Chicago Academy of Sciences. The former contains a large set of specimens, identified by Carpenter, of species described by him.

The author has been aided by the late G. L. Wilkins of the Zoology Department of the British Museum (Natural History). He checked the collections of that institution for possible types, provided the information from the labels on such specimens, and arranged for the photographing of them. Without his aid the data concerning the pertinent specimens in England could not have been included in this report. Harald Rehder, J. Wyatt Durham, H. A. Pilsbry, and John C. Armstrong co-operatively checked the collections and data in regard to queries and provided photographs of specimens in their respective institutions.

In the course of the search for types and pertinent original material of Carpenter's West Coast species the authorities of the Redpath Museum brought to light about 140 letters in the Carpenter files of that institution. They represent communications from leading conchologists in America and abroad to Carpenter during the period 1859 to 1877. They contain facts concerning scientists, collections, and natural history not compiled in printed accounts. Similar letters were inspected from the archives of the Boston Society of Natural History and the Museum of Comparative Zoölogy. More letters probably will be found. The writer hopes to complete a separate report describing details from original sources of a stage in American conchology not hitherto published.

## PHILIP PEARSALL CARPENTER

### LIFE

Philip Pearsall Carpenter, an English Presbyterian minister, was one of the chief figures in the second period of American conchology, which the late W. H. Dall termed the Gouldian Period (about 1841–1870). Carpenter was born on November 4, 1819, in Bristol, England. He occupied the pulpit<sup>3</sup> at Stand (1841–1846), near Manchester, and at Warrington from 1846 until 1858. At that time he made his first visit to America. He came with large boxes of shells from the Reigen Mazatlan collection which were destined for the State Cabinet of Natural History (Museum) at Albany, New York (Palmer, 1951, p. 5). He spent about a year and a half in America and travelled about 12,400 miles from Quebec to Falls of St. Anthony, Minnesota, to Charleston, South Carolina. After his return to England, he married a German lady, Minna Meyer. At the same time they

<sup>3</sup> Carpenter's father was an eminent Unitarian preacher, Dr. Lant Carpenter; a brother Russel was a minister, another brother was the celebrated scientist, Dr. W. B. Carpenter, and a sister Mary was the active philanthropist and reformer.

adopted an American orphan boy who had helped Philip in the Smithsonian Institution and whom Carpenter befriended there. Contacts both scientific and human drew him back to America, and in November, 1865, he and his family returned to Montreal. There he ran a school for boys. He entered energetically into civic and religious life of the city and carried on his scientific pursuits, studying and arranging his extensive shell collection which he had brought from England and donated to McGill University. He died in Montreal May 24, 1877, and was buried in Mount Royal Cemetery. On his trip to the United States (1860) Carpenter was given the first degree of Doctor of Philosophy granted by the Regents of the State of New York. From the time of his visit to America he ceased to occupy a regular pulpit, but his activities in helping his fellows by lecturing, preaching, organizing, or by kind deeds never lessened. He was a vehement prohibitionist and abolitionist, a vegetarian, and an energetic worker for sanitation and reforms in conditions of the poor and illiterate. He was respected and loved by all, whether they agreed with his doctrines or not.

#### SCIENTIFIC CAREER

Philip Carpenter seemed to have had a natural love for shells. He was initiated into the study of mollusks in his early teens by the association with Samuel Stutchbury (1797–1859), zoologist, and Samuel Worsley<sup>4</sup> [not known] geologist, at the Bristol Institution. This museum had rich collections of fossils and shells. Philip in 1832 arranged cabinets in that museum. A specimen of *Macrocalista chione* (Linnaeus) preserved in the Chicago Natural History Museum, bears the label, "This identical specimen was the first beginning of my collection of shells, being offered by my sister Mary and earned by me, as a prize for order! I think in June, 1832 (31)." In 1833, he was helping Mr. Stutchbury 3 or 4 hours a day, working particularly on chitons. In the same year Carpenter became acquainted with Dr. J. E. Gray, Keeper of Mollusca in the British Museum, who was a strong influence in the beginning of Carpenter's scientific career. In 1836, the British Association for Promotion of Science met at Bristol, and Philip helped arrange the conchological collection. He had at that early age developed a discriminating judgment of species determination.

In spite of his fondness for natural history, Carpenter continued his training for the ministry. He was ordained in 1841. In 1842, when contacts were made again with scientists of kindred interest at a meeting of the British Association for the Advancement of Science in Manchester, his old love was revived. He visited with Robert Patterson (1802–1872), biologist, John Fleming (1785–1857), zoologist, G. B. Sowerby (1812–1884), zoologist, C. W. Peach (1800–1886), geologist, G. W. Wood (M.P.), Dr. William Buckland (1794–1856), geologist, Dr. C. G. B. Daubeny (1795–1867), botanist and chemist, and Prof. Baden Powell (1796–1860), mathematician. When the same association met at York (1844) he went with his brother, the esteemed scientist, Dr. W. B. Carpenter. He again accompanied the same brother to the meeting at Cambridge in

<sup>4</sup> Carpenter (1858, p. 438) wrote, "It was to serve as eyes [Worsley was blind] to guide his knowledge, that I commenced the study of shells."

1845. From 1846-1858 he preached at Warrington. To help unemployed factory workers he founded an industrial school. To carry on the activities of the school as well as teach a trade, he managed to acquire an antiquated press and type and to learn printing. This was the beginning of the "Oberlin Press," on which he printed for himself and other reformers tracts and extended papers on sanitation, teetotalism, religious and school reports, or anything which Carpenter believed would better human conduct and conditions of life. Better machinery, type, and experience were gradually gained until in 1855-1857 his 552-page *Catalogue of the Reigen Collection of Mazatlan Mollusca in the British Museum* was printed by P. P. Carpenter at the Oberlin Press, by order of the Trustees of the British Museum. This was the largest single report that Carpenter published.<sup>5</sup> He had in 1855, with the aid of a brother-in-law, purchased the famous Reigen Mazatlan shells. This became the turning point in his life. The events and his scientific labors in connection with those specimens occupied more of his time. A description of the Mazatlan collection was included by Carpenter (1857b, p. 241-265; 1957a; 1860, p. 23-27; 1864b, p. 542, 548; 1872, p. 28-34; Palmer, 1951, p. 5) in his report to the British Association in 1856 (1857b) and again in 1863 (1864b) and in the introduction to the Mazatlan Catalogue as well as to the catalogue of the first duplicate Mazatlan Collection presented to the State Cabinet of Natural History (Museum). Those publications are rare. Because a brief survey of the collection and Carpenter's association has been given by the author in a catalogue (Palmer, 1951) of the duplicate material at the New York State Museum, further details will not be included here. Carpenter thought that a small industrial town such as Warrington was not a proper place to house permanently the primary selection of the material, including the types of new species described. Through the persuasion of Dr. J. E. Gray the original suite, about 8873 specimens, was deposited in the British Museum. Material several times that amount, from which he made up duplicate sets, was retained.

Although at that time Carpenter was a novice in conchology there seemed no one better available to study the material. In addition, he was asked to prepare a report in 1855 for the British Association for the Advancement of Science, "on the Present State of our Knowledge with regard to the Mollusca of West Coast of North America." Thus he began scientific pursuits, not only by examining thousands of shells but by forging into a thorough and laborious compilation of the voluminous and scattered literature in which any mention was made of west American molluscan species. His abstracts, delineated with lists of species and references, were meant to include all original sources from the collection of Dombey, 1778 (Peru), to Bridges, 1856 (Panama), and of all other pertinent writings and monographs. The résumés were followed by detailed geographic tables in which were embodied the data which had been extracted from the literature and analysis of the species in the faunal districts. This report of 318 pages (4 plates) was followed in 1863 (1864) by a supplementary report to the British Association on the Mollusca of the same area. In the supplement he corrected old

<sup>5</sup> The chiton manuscript which remained unfinished at his death would have exceeded the Mazatlan catalogue in size and importance.

errors, noted previous omissions, gave additional information on collections, expeditions, and original notes gained from his examination of previously identified material and from unidentified and undescribed species of shells that were sent to him through the Smithsonian Institution or directly to him by collectors on the West Coast. Those two papers are a wealth of concise information of eastern Pacific conchological literature from Linnaeus to Carpenter's time. Their usefulness is impaired by the rarity of the publications which also include the Smithsonian Institution reprint (1872) of the 1863 (1864) report. The latter could well be reprinted again. The reprint of Carpenter's papers by the Smithsonian Institution is referred herein as Reprint, 1872. (*See* bibliography.)

The extensive size of the Mazatlan material induced and riveted the carrying on of Carpenter's natural-history bent. He made up duplicate sets of the Mazatlan material. One set was accepted by the New York State Cabinet of Natural History (State Museum) at Albany, New York, on condition that Carpenter would bring the shells to America and arrange them (Palmer, 1951, p. 5-8). The details of the Albany collection have been written up by the author and will not be repeated here.

Carpenter sailed for America December 8, 1858, and did not return until June, 1860. During that time he had arranged the collection at Albany and made a firm friend of Col. Ezekiel Jewett, curator of the State Cabinet of Natural History. Carpenter later described new species from Jewett's collection of West Coast mollusks. He visited Montreal three times and lectured at McGill University at the request of Sir William Dawson, principal. Common interests and respect were formed between Dawson and Carpenter and resulted in permanent friendship and eventual association in Montreal in the museum at McGill University.

One of his chief objects in coming to the United States was to examine types of described species, particularly western American species, in order to compare them with those specimens in England. His natural-history bent led him to Dr. A. A. Gould in Boston, Louis Agassiz at Cambridge, the C. B. Adams collection at Amherst, Massachusetts, the Bland collection in Brooklyn, Binney's collection of land shells in Burlington, Vermont, the Academy of Natural Sciences in Philadelphia, Professors McCrady, Ravenal, and Gibbs in Charleston, South Carolina, and John G. Anthony at Cincinnati; he made a collecting trip for Unionidae with Alpheus Hyatt in the Green River in Kentucky. He was employed for 5 months in the winter of 1859-1860, by Joseph Henry, Secretary of the Smithsonian Institution, in unpacking and arranging the shells of that institution. When he returned to England in June, 1860, large quantities of shells were sent to him from the Smithsonian for comparison with types in England, especially with those of Hugh Cuning.

He spent a large portion of the time in the next 5 years in the museum at Warrington, where he built up natural-history collections, worked on Smithsonian shells, published the description of new Pacific Coast mollusks, attended



meetings of the British Association for Advancement of Science, where he was of great help in arrangements, and continued lecturing and some preaching.

On October 26, 1865, he and his family sailed from England for Montreal where he spent the remainder of his life except for one trip Home in 1874. In 1866, he was approached in regard to a professorship of natural history at Cornell University, Ithaca, New York. But his ties were too strong in Montreal for him to shift to Yankeeland. His health declined gradually until he finally succumbed to typhoid fever, May 24, 1877.

In exchanging Mazatlan shells and in the extensive arrangement of duplicate sets for the Smithsonian Institution, Carpenter accumulated an extensive collection of his own. Although he had mounted and arranged the greater portion of his collection, which is in the Redpath Museum at McGill University, his death ended the work. His early death also prevented the finishing of a large and authoritative work on the chitons which was to have been published by the Smithsonian Institution. The work was in manuscript form with the illustrations drawn, but it had not reached the final written stage for publication. Much of the information was published by Dall, in his smaller chiton articles, and by Pilsbry, in his chiton monographs. Both had access to Carpenter's manuscript and illustrations, and both used his notes freely, with appreciative acknowledgment, and with more credit to Carpenter than a strict application of international zoological nomenclatural rules will allow.

Philip Carpenter, in addition to the Ph. D. granted by the Regents of the University of the State of New York, was a corresponding member of the Academy of Natural Sciences of Philadelphia, the California Academy of Sciences, and the Lyceum of Natural History in the City of New York. He was an honorary member of the Natural History Society of Northumberland, Durham, and Newcastle-on-Tyne.

#### ASSOCIATION WITH INSTITUTIONS AND COLLECTIONS

*Mazatlan collection.*—In the spring of 1855, with the help of his brother-in-law, Mr. Herbert Thomas, Carpenter purchased for 50 pounds the famous Mazatlan Collection of shells. Up to that period, with the exception of Hugh Cuming's material, it was the greatest collection ever taken to Europe. The specimens had been gathered with care by Frederick Reigen, a Belgian, from 1848 to 1850 at Mazatlan, Gulf of California. Practically all had been taken alive. Carpenter (1864b, p. 540) noted in his discussion of Major Rich (U. S. Expl. Exped.) that Rich had met Reigen at Mazatlan and had reported that Reigen had been called before the police because of the stench from the decomposing mollusks on his premises. The collection contained few strays, and large numbers of individuals of the species made it a unique series to illustrate suites of variation. For details of the collection and the catalogue which Carpenter published on it, see Carpenter's Report to British Association for 1856 (1857b), the Mazatlan Catalogue (1857a), Report to British Association for 1863 (1864b), and Palmer (1951).

Carpenter described 222 new species in the Mazatlan Catalogue (1857) and listed 694 species. The first collection consisted of 8873 specimens mounted on

2529 tablets.<sup>6</sup> This primary collection was deposited in the British Museum (Natural History). Drawings were made of the specimens of the species described in the catalogue. A set of these drawings is in the United States National Museum, but no complete set of illustrations of the Catalogue was ever printed.

The first duplicate series of shells (6584 specimens) and pictures of Mazatlan material were brought to America by Carpenter and deposited in the New York State Cabinet of Natural History (Museum). (See Palmer, 1951.) The Redpath Museum has a large and partially mounted series. Other museums have duplicates from the Reigen collection through distribution by Carpenter.

Illustrations of the types of the species described by Carpenter from Mazatlan are not included in this report. The figuring of the already printed catalogue would constitute a separate major work.

A list of the species described by Carpenter from Mazatlan, which range northward into the California area is included herein.

*British Museum (Natural History).*—Although never in residence at the British Museum, Philip Carpenter began his scientific career under the inspiration of Dr. J. E. Gray, Keeper of Mollusca of that institution. Through Gray's influence the first set of the Reigen Mazatlan collection was presented to the British Museum. In consequence of this, Carpenter was asked to write the catalogue of that collection in the British Museum (1857b). Friendly and mutually profitable relations continued through Carpenter's life not only with the Museum but with the eminent conchologists of his day. He received advice, help, and unrestricted use of collections and library from Hugh Cuming, J. E. Gray, R. M. Andrew, J. D. Gaskoin, L. Reeve, W. Clark, W. Bean, S. Hanley, J. Alder, R. D. Darbishire, W. Baird, H. and A. Adams, T. Hincks, S. P. Woodward, G. B. Sowerby, and F. Archer. Labels in his collection testify to the associations he established and to the confidence he inspired.

*U. S. Exploring Expedition and A. A. Gould.*—In the Report to the British Association for Advancement of Science for 1856 (1857a, p. 208–213) Carpenter listed the dates, the ships used, the localities visited and the species described and determined by Dr. A. A. Gould. Again in 1863 (1864b, p. 529–532, 578, 582, 583), in a report to the same body of British scientists, he enumerated from first-hand information the trials connected with the making of the Gould collections. At the request of Joseph Henry, secretary of the Smithsonian Institution, Carpenter was employed in 1859 to arrange the shell material of the above expeditions. Previously Gould had, as Carpenter acknowledged in the Mazatlan Catalogue (1857a, p. iv, footnote) “. . . intrusted to my care, and to the perils of the Atlantic, the whole of his collections and notes from W. American coast, for comparison with those known in this country.” Gould's and Carpenter's names were linked in joint authorship in 1856 (Gould and Carpenter, 1856, p. 198–208).

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<sup>6</sup> Tablets containing a numbered suite of shells are recorded in sequence in the published catalogue. Hence, a collection so mounted and numbered can be tied in definitely with the published notes.

*New York State Cabinet of Natural History (Museum).*—Carpenter's association with the New York State Cabinet of Natural History was consummated by his donation and arrangement of the first duplicate series of the Reigen Collection of Mazatlan shells (1859). The story and analysis of that collection have been published (Palmer, 1951).

*Smithsonian Institution.*—A brief summary of the general activities of the Smithsonian Institution is presented by Carpenter (1864b, p. 578). A list of the sources of the collections in the Smithsonian at that time was included. The sources included material from eight expeditions, beginning with the U. S. Exploring Expedition, 1837–1840, through the expedition of the U. S. North-West Boundary Survey, 1857–1861, under Com. A. Campbell, with Dr. C. B. R. Kennerley and George Gibbs as collectors. Sixteen private collectors up to the same period had provided additional critical material to the collections of the Smithsonian. Many new forms found by several of those collectors were described by Carpenter. He spent 5 months (1859–1860) in Washington, D. C., living in the Smithsonian Institution building. The work on the collections could not be completed in that short time. Arrangements were made, and the specimens were shipped to England. Carpenter compared the specimens with named forms in the Hugh Cuming Collection in the British Museum (Natural History), with the help of Cuming. A special label "Named by Hugh Cuming, Esq. for the Smithsonian Institution, Washington, D. C." was printed to indicate such service. This is one of several printed labels associated with Carpenter's labors on the collections which may be found in the U. S. National Museum, and in institutions, such as the New York State Museum and the Redpath Museum, which acquired material from the Smithsonian Institution.

*Warrington Free Museum and Library.*—After Carpenter's return from America to Warrington in June 1860, he arranged with the Warrington Museum for the use of an unoccupied room and rented three rooms from a house adjoining. There he worked on the collections which were sent from the Smithsonian, large collections he had made in America for the Warrington Museum, and his own. He had purchased all the remaining shells of the Reigen Mazatlan stores, part of the C. B. Adams material from Panama, Jamaica, St. Thomas, and Bermuda. He also became agent for some leading naturalists in negotiating transactions in connection with their duplicates. About half of Carpenter's papers were written at Warrington, including his valuable and comprehensive *Supplementary Report on the Present State of our knowledge with regard to the Mollusca of the West Coast of North America*, which was reprinted, with 13 of his other articles, by the Smithsonian Institution in 1872. He remained at Warrington until his departure for Montreal in October 1865. J. R. le B. Tomlin wrote (Personal communication, November 11, 1947) that he did not believe the Warrington Museum contained any types. J. R. Rimmer, Director of the Municipal Museum and Art Gallery, Warrington, examined the list of missing types of Carpenter species, as included herein, and reported (Personal communication, October 2, 1956) that there are no types of Carpenter species in that Museum.

*Redpath Museum, McGill University.*—McGill College (University) accepted the Carpenter collection October 26, 1867, on condition that Carpenter arrange the material, and this he worked on until his death in 1877. He had taken 33 years to form the collection, and its monetary value had been estimated by Sowerby as 1000 pounds. Although it contained few expensive shells it was valuable because so many specimens had been compared with types. It is important to students of the West Coast fauna in particular because of its large number of undisturbed types of species described by Carpenter. Present-day collections contain greater numbers of shells, better preserved, and more carefully collected, but the importance of the Carpenter collection is its pertinence to taxonomy. It contains duplicate shells from original collection of species, such as those described by Adams from Japan (Kuroda and Habe, 1954) which have never been illustrated and which from lack of original material are obscurely known today. The Redpath Museum molluscan stores have been discussed briefly elsewhere (Palmer, 1945, p. 97–102; Cleghorn, 1950, p. 70).

#### COLLECTORS OF WEST COAST SPECIES DESCRIBED BY CARPENTER

Philip Carpenter was never on the Pacific Coast of North America and did not collect any of the shells of the species he described. Such published statements as that of Kelsey (1902, p. 144) in a note on *Serridens oblongus* Cpr. in which he quoted Dall as saying, "the single valve found by Dr. Carpenter at San Diego, in 1866, was on record," are misleading. Kelsey misunderstood words of Dall in regard to the record. Collections referred to as Carpenter Collections have been inferred by some persons unfamiliar with the history of West Coast associations to be material collected by Carpenter. Such a denotation in association with collections may indicate that either the material was of Carpenter's transactions or identification.

Most of the shells from the area of this report, from which Carpenter segregated and described new species, were obtained through the Smithsonian Institution and/or the California Geological Survey. The collectors of such material were listed by Carpenter (1864b, p. 579). Those pertinent to this monograph are briefly given below:

- (1) "James G. Swan, from Port Townsend, Cape Flattery, Neeah [*sic*] Bay, and the neighboring shores of Vancouver: at intervals, during many years."  
(Also, Carpenter, 1864b, p. 606)

Mr. Swan, as Indian teacher at Neah Bay, N.W.T., trained the children to gather shells. Appropriate labels printed by the Smithsonian Institution may be found in the collections distributed by that institution following the identification of the species by Carpenter. These labels read, "Collected by the Indian children at Neeah Bay [*sic*] W. T. and Vancouver by Mr. J. G. Swan (Teacher)."

The following new species collected by Swan were described by Carpenter (1864d, p. 423–429; 1865a, p. 28–32). See text for discussion of each. Additional

localities with accompanying data are in brackets. The collector or source of the collection is in parentheses.

*Maera salmonca* [San Francisco (Pacific Railway Explor. Exped.); Monterey (Cooper)]  
*Angulina variegatus* [Monterey, Catalina (Cooper)]  
*Miodon prolongatus* [Monterey (Taylor)]  
*Adula styliana* [Shoalwater Bay (Cooper)]  
*Axinea* (? *septentrionalis*, var.) *subobsoleta*  
*Siphonaria Thersites*  
*Mopalia* (*Kennerleyi*, var.) *Sevannii* [sic]  
*Margarita cidaris*  
*Gibbula parcipecta* [Santa Cruz (Rowell)]  
*G. succincta* [Lower California (Rowell)]  
*G. lacunata*  
*G. funiculata*  
*Hipponyx cranioides*  
*Bizonia compacta*  
*Lacuna porrecta*  
*L.* (? *solidula*, var.) *compacta*  
*L. variegata*  
*Isapis fenestrata* [San Diego, Santa Barbara Island (Cooper)]  
*Alvania reticulata*  
*Alvania filosa*  
 ? *Assimineca subrotundata*  
 ? *Paludinella castanea*  
*Mangelia crebricostata*  
*M. interfossa*  
 ? *M. tabulata*  
 ? *Daphnella effusa*  
*Odostomia satura*  
*O.* (? var.) *Gouldii*  
*O. nuciformis*  
*O.* (? var.) *avellana*  
*O. tenuisculpta*  
*Scalaria Indianorum*  
*S.* (? *Indianorum*, var.) *tincta* [Cerros Island (Ayres); San Pedro (Cooper)]  
*S. (Opalia) borealis* Gould [Puget Sound (United States Expl. Exped.)]  
*Cerithiopsis munita*  
*C. columna* [Monterey (Cooper)]  
*Cancellaria modesta*  
*Velutina prolongata*

Specimens collected by J. G. Swan were included in the proterotypes of *Ostrea lurida*, *Bittium* (? var.) *esuriens*, and *B. attenuatum* (Carpenter, 1865g).

(2) "Dr. J. G. Cooper, early private collections from Shoalwater Bay and various stations in California and from Panama; and lately dredged collections of the California State Geological Survey, of which a portion were sent in advance by Dr. Palmer." (Carpenter, 1864b, p. 579).

Carpenter (1864b, p. 607, 608, 610) presented a discussion of J. G. Cooper's

collection and his relation to the "California State Geological Survey" under the direction of J. D. Whitney and W. M. Gabb, paleontologist of the same survey. Cooper sent shells and wrote copious notes to Carpenter in regard to the specimens found. Many of those records, with drawings, are preserved in the Redpath Museum. Cooper material which was used in the preparation of the descriptions of new species is enumerated in the other lists following, inserted in parenthesis.

The following new species were described by Carpenter (1864e-1865b, p. 155-159) from the source discussed above:

<i>Calliostoma formosum</i>	State Collection 615a
<i>C. splendens</i>	State Collection 630a
<i>Solarrella peramabilis</i>	State Collection 1025
<i>Margarita acuticostata</i>	State Collection 354
<i>M. salmonea</i>	State Collection 352
<i>Liotia fenestrata</i>	State Collection 1006
<i>Amycla undata</i>	State Collection 1067
<i>Leptonyx (sanguineus, var.) purpureum</i>	
<i>L. bacula</i>	State Collection 1056
<i>Corbula luteola</i>	State Collection 587
<i>Plectodon scaber</i>	State Collection 1062
<i>Macoma indentata</i>	State Collection 365
<i>Oedalina (Cooperella) scintillaeformis</i>	State Collection 533a
<i>Semele incongrua</i>	State Collection 1061
<i>Psephis salmonea</i>	State Collection 1068
<i>Astarte fluctuata</i>	State Collection 1060
<i>Cardium (? modestum, var. centifiliosum)</i>	State Collection 381
<i>Lepton meroëum</i>	
<i>Pristiphora oblonga</i>	
<i>Leda hamata</i>	State Collection 984
<i>Acanthopleura fluxa</i>	
<i>Ischnochiton veredentiens</i>	State Collection 518a (bis)
<i>Lepidopleurus pectinatus</i>	State Collection 1073
<i>L. scabricostatus</i>	State Collection 1071c
<i>Trachydermon Gothicus</i>	State Collection 518a
<i>Leptochiton nexus</i>	State Collection 1071a
<i>Nacella (? paleacea, var.) triangularis</i>	State Collection 416c
? <i>N. subspiralis</i>	State Collection 416b
<i>Acmaea (? pileolus, var.) rosacea</i>	
<i>Scurria (?) funiculata</i>	State Collection 466d
<i>Puncturella Cooperi</i>	State Collection 1029
<i>Gibbula optabilis</i>	
<i>Calliostoma supragranosum</i>	
<i>Ethalia supravallata</i>	
<i>E. var. invallata</i>	
<i>Galerus contortus</i>	State Collection 369
<i>Caecum crebricinctum</i>	State Collection 388
<i>C. Cooperi</i>	State Collection 667a
<i>Turritella Cooperi</i>	State Collection 564
? <i>Mesalia tenuisculpta</i>	State Collection 666a
<i>Isapis obtusa</i>	State Collection 682
<i>Rissoina interfossa</i>	State Collection 387b
<i>Rissoa acutelirata</i>	

<i>Fenella pupoidea</i>	State Collection 389
<i>Amphithalamus tacunatus</i>	
<i>Diala acuta</i>	State Collection 390
<i>D. marmorea</i>	
<i>Styliferina turrata</i>	
? <i>Jeffreysia translucens</i>	
<i>Cythna albida</i>	
<i>Chrysallida pumila</i>	
<i>C. cincta</i>	
<i>Chemnitzia chocolata</i>	State Collection 428
<i>C. subcuspidata</i>	State Collection 670a
<i>Eulima</i> (? var.) <i>compacta</i>	
<i>E.</i> (? var.) <i>rutila</i>	
<i>Scalaria bellastrata</i>	State Collection 393b
<i>S. subcoronata</i>	State Collection 393a
<i>S. crebricostata</i>	State Collection 393
<i>Opalia spongiosa</i>	
<i>O. retiporosa</i>	State Collection 1014
<i>Nassa insculpta</i>	State Collection 1008
? <i>Amycla chrysalloidea</i>	State Collection 613
<i>Anachis subturrata</i>	
<i>Trophon triangularis</i>	State Collection 580a
[ <i>Kennerlia bicarinata</i> (Carpenter, 1864c)]	State Collection 1063]

(3) Dr. Kennerley, collector for United States Northwest Boundary Survey under Com. A. Campbell

The following new species in Kennerley's collections from Puget Sound were described by Carpenter (1865e, p. 54-64) :

- (*Shaenia* [sic]) *Sphaenia ovoidea*  
*Neaera pectinata* (Catalina and Santa Barbara, Cooper)  
*Kennerlia filosa* (1864) (San Diego, Cooper)  
*Psammobia rubroradiata* (Nuttall ms.)  
*Macoma yoldiformis*  
*M.* (? var.) *expansa*  
(*Tellina*) *angulus modestus* (Neah Bay, Swan; San Pedro, Cooper)  
? *Clementia subdiaphana* (Vancouver, Forbes)  
*Venus kennerleyi* (Neah Bay, Swan)  
*Astarte* (? *compressa*, var.) *compacta*  
*Lucina tenuisculpta*  
*Cryptodon serricatus* (Vancouver, Swan)  
*Pythina rugifera*  
*Tellimya tumida* (Neah Bay, Swan; San Diego, Cooper)  
*Cylichna* (? *cylindracea*, var.) *attonsa* (California, Jewett, Cooper)  
*Dentalium rectius*  
*Mopalia kennerleyi*  
? *M. sinuata*  
? *M. imporcata*  
*Ischnochiton* (*Trachydermon*) *retiporosus*  
*I.* (*Trachydermon*) *trifidus*  
*I.* (*Trachydermon*) *pseudodentiens* (Vancouver, Lord; San Diego, Cooper)  
*I.* (*Trachydermon*) *flectens* (Vancouver, Lord; Monterey, Taylor; San Diego, Cooper)  
*Lepeta caecoides* (Farallon Islands, Darbishire)

*Calliostoma* (? var.) *variegatum*  
*Margarita* (? var.) *tenuisculpta* (Neah Bay, Swan)  
*M. lirulata*  
*M. lirulata* var. *subelevata* (Neah Bay, Swan)  
*M. lirulata* var. *obsoleta* (Neah Bay, Swan)  
*M. lirulata* var. *conica*  
*M. inflata* (Vancouver, Lyall; Neah Bay, Swan)  
*Mesalia lacteola* (Vancouver, Forbes)  
*M.* (? *lacteola* var.) *subplanata* (Neah Bay, Swan)  
*Rissoa compacta* (Neah Bay, Swan)  
*Drillia incisa* (Neah Bay, Swan)  
*D. cancellata*  
*Mangelia levidensis* (Neah Bay, Swan)  
*Bela excavata*  
*Eulima micans* (Neah Bay, Swan; San Pedro, San Diego, Catalina, Cooper)  
*Ocenebra interfossa* (Neah Bay, Swan; Vancouver, Lord)  
*O. interfossa atropurpurea*  
 ? *Chrysodomus rectirostris*

- (4) Mr. A. S. Taylor, from Monterey, and Mr. Andrew Cassidy from San Diego. Species described by Carpenter (1865g, p. 129-149) included specimens from those collectors and from Cooper, Ayres, Newberry, and Xantus. The following are based on shells from Taylor or Cassidy only:

<i>Kellia rotundata</i>	Monterey, Taylor
<i>Cylichna planata</i>	San Diego, Cassidy
? <i>Daphnella aspera</i>	Monterey, Taylor

- (5) Rev. J. Rowell of San Francisco provided material for a few Carpenter species, from Farallon Islands and especially from Panama and Gulf of California (Carpenter, 1865d, p. 278-281). They are not included in this report unless the species extends into the northern regions.
- (6) Mr. John Xantus, of the U. S. Coast Survey, from Cape San Lucas. Most of the species from Xantus material were described by Carpenter (1864a). They are not included in this report unless they range northward. For details of Xantus collecting see Carpenter (1864b, p. 616, 617).
- (7) The material collected by Col. E. Jewett from the West Coast formed his private collections. At the time of Carpenter's writing (1864b) the shells belonged to Jewett's daughter, Mrs. Boyce of Utica, New York. They were scattered during the period following, and most are now in the U. S. National Museum, Redpath Museum, Cornell University, or lost. (See Carpenter, 1864b, p. 535-539.) Many belong to the fauna south of the region involved in the present paper.

The following new species from Jewett's collections were described by Carpenter (1865i; 1866b). Material involved in the description of the species which came from other sources is in parenthesis.

*Solen* (? *sicarius*, var.) *rosaccus* (San Pedro, Cooper)  
*Luzaria subquadrata* (Monterey and San Pedro, Cooper. State Collection 403)  
*Modiola fornicata* (Monterey, Taylor)



- Pecten* (? var.) *acquisulcatus* (San Diego, Cassidy, Newberry, and Cooper)  
*Pecten paucicostatus* (Santa Barbara Island, Cooper)  
*Pecten* (? var.) *squarrosus*  
*Volvula cylindrica*  
*Phasianella* (? *compta*, var.) *punctulata*  
*P.* (? *compta*, var.) *pulloides* (Monterey, State Collection 353; Catalina, Cooper)  
*P.* (? *Compta*, var.) *elatior*  
*Trochiscus convexus*  
*Hipponyx tumens* (San Pedro, Cooper)  
*Bittium* (? var.) *esuriens* (Neah Bay, Swan; Monterey, Cooper)  
*B. fastigiatum*  
*Amphithalamus inclusus* (San Diego, Cooper)  
*Drillia moesta* (San Pedro, Cooper)  
*Mitromorpha filosa* (Lower California Museum, Cuming)  
*Mangelia variegata*  
*M.* (? *variegata*, var.) *nitens*  
*M. angulata*  
*Myurella simplex* (San Pedro, Cooper)  
*Odostomia inflata* (Farralon Island, Darbshire; San Francisco, Rowell; Neah Bay Swan)  
*Chemnitzia crebrifilata*  
*C.* (? *torquata*, var.) *stylina* (Monterey, Cooper)  
*C. Virgo*  
*Dunkeria laminata* (San Diego, Cooper)  
*Eulina Thersites*  
*Opalia bullata*  
*Cerithiopsis purpurea* (Monterey, San Diego, Cooper)  
*C. fortior*  
*Marginella subtrigona*  
*M. regularis* (South of Monterey, Catalina, Cooper)  
*Amycla tuberosa* (South of Monterey, Catalina, Cooper)  
? *Anachis penicillata* (San Diego, Catalina, Cooper)  
*Siphonalia fuscotincta*

The following were described from near Santa Barbara, Pleistocene (Carpenter, 1864b, p. 539; 1866b).

- Turritella Jewetti* (San Diego beach, Cassidy)  
*Bittium* ? *asperum* (San Pedro, San Diego, Catalina, State Collection 591c, Cooper)  
*B. armillatum*  
*Opalia* (? *crenatoides*, var.) *insculpta*  
*Trophon tenuisculptus*  
*Pisania fortis*

## DEPOSITORIES OF TYPES

The following is a list of the location of types of the marine molluscan species described by Carpenter from the West Coast (British Columbia to San Diego). Unless otherwise stated the type or types are understood to be the holotype or syntypes.

### ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

#### Amphineura

- Leptochiton rugatus* Pilsbry [Carpenter ms.]. No. 35586  
*Ischnochiton acrior* Pilsbry [Carpenter ms.] No. 35702  
*I. conspicuus* Pilsbry [Carpenter ms.] No. 35709. See also "Dall."

## BRITISH MUSEUM (EXCLUSIVE OF MAZATLAN COLLECTION)

## Pelecypoda

- Humiliaria kennerleyi* (Reeve)=[Carpenter ms.], described as *Venus Gari rubroradiata* (Nuttall ms. Carpenter), described as *Psammobia* and/or *Sanguinolaria*=*G. californica* (Conrad)  
 "Venus (*Chione*) *excavata*"=young of *Chione undatella* Sowerby

## Gastropoda

- Callopora* ? *fluctatum* var. *depressum*  
*Cerithidea hegewischii albonodosa*, described as *C. albonodosa*  
*Crepidula rugosa* Nuttall ms., Carpenter=*C. onyx* Sowerby  
*Fissurella ornata* Nuttall ms., Carpenter=*F. volcano* Reeve  
*Olivella intorta*  
*Ocenebra poulsoni*, described as *Ocenebra Poulsoni*

## Amphineura

- Chiton acutus*=*Mopalia acuta*  
*Cyanoplax hartwegii nuttallii*, described as *Chiton nuttalli*  
*Ischnochiton regularis*, described as *Chiton*  
*Chiton montereyensis*=*Mopalia lignosa* (Gould)

## MUSEUM OF PALEONTOLOGY, UNIVERSITY OF CALIFORNIA

## Gastropoda

- Alvania acutelirata*, described as *Rissoa*. No. 15572  
*Ocenebra squamulifera* (Carpenter in Gabb), described as *Trophon*. No. 15459  
*Trophonopsis triangulatus*, described as *Trophon*. No. 12572 lectotype; also U.S.N.M.  
*Admete gracilior*, described as *Cancellaria*. No. 15530-15531  
*Acteocina planata*, described as *Cylichna*. No. 33501

## PALEONTOLOGICAL LABORATORY, CORNELL UNIVERSITY

## Gastropoda

- Opalia insculpta*, described as *O. (? crenatoides* var.). No. 4950  
*Ocenebra tenuisculpta*, described as *Trophon*. No. 4951

## Amphineura

- Mopalia plumosa*=*M. acuta*. No. 25530, Newcomb Collection

## REDPATH MUSEUM, MCGILL UNIVERSITY

## Pelecypoda

- Ostrea lurida*. No. 125  
*Modiolus fornicatus*, described as *Modiola*. No. 3133  
*Miodontiscus prolongatus*, described as *Miodon*. No. 2377; also U.S.N.M.  
*Axinopsida sericata*, described as *Cryptodon*. No. 112; also U.S.N.M.  
*Pristes oblongus*. No. 15372; also U.S.N.M.  
*Psephidia salmonca*, described as *Psephis*. No. 115; also U.S.N.M.  
*Darina declivis*. No. 101

## Gastropoda

- Acmaea triangularis* (*casta* ms. as *Nacella*). No. 2370; also U.S.N.M.  
*Bittium armillatum*. No. 4851; also U.S.N.M.  
*Opalia bullata*=*O. spongiosa*. No. 76  
*Chemnitzia crebrifilata* Carpenter=*Turbonilla tenuicula* (Gould). No. 2363  
*Turbonilla stylina*, described as *Chemnitzia*. No. 5729. Also U.S.N.M.

- Mitrella tuberosa*, described as *Amycla*. No. 73  
*Gibberulina pyriformis*, described as *Volutella*. No. 83 (as *Gibberula*) ; also U.S.N.M.  
*Cystiscus jewettii*, described as *Marginella*. No. 80 (as *Gibberula*)  
*C. regularis*, described as *Marginella*, No. 82 (as *Gibberula*) ; also U.S.N.M.  
*Cystiscus subtrigona*, described as *Marginella*, No. 81 (as *Gibberula*)  
*Siphonalia fuscotincta*=*Kelletia kelletii* (Forbes). No. 3138  
*Mangelia angulata*=*M. barbata* Oldroyd. No. 90  
*M. interfossa*. No. 94 ; also U.S.N.M.  
*M. nitens*, described as *M. ? variegata* var. No. 93  
*M. variegata*. No. 92 ; also U.S.N.M.  
*Propebela tabulata*, described as ? *Mangelia*. No. 89  
*Mitromorpha filosa*, described as *Daphnella* and/or *Mitromorpha*. No. 96  
*Volutella cylindrica*, described as *Voluta*. No. 2364

## Amphineura

- Cyanoplax hartwegii*. No. 68  
*Chaetopleura gemma* Dall or Pilsbry [Carpenter ms.]. No. 49  
*Ischnochiton corrugatus* Carpenter in Pilsbry. No. 37  
*I. conspicuus* "Dall." No. 65. See also Pilsbry  
*I. fallax* Carpenter in Pilsbry. No. 64  
*I. newcombi* Carpenter in Pilsbry. No. 19  
*I. radians* Carpenter in Pilsbry. No. 25, also U.S.N.M.  
*Ischnochiton aureotinctus* Carpenter in Pilsbry. No. 26  
*I. pectinatus*. No. 70. See *I. californiensis* Berry  
*I. sinudentatus* Carpenter in Pilsbry. No. 27  
*Callistochiton palmulatus* Carpenter in Pilsbry No. 48  
*Mopalia imperata*. No. 57, also U.S.N.M.  
*M. sinuata*. No. 58, also U.S.N.M.  
*Dendrochiton gothica*, described as *Ischnochiton*. No. 13 ; also U.S.N.M.  
*Acanthochiton avicula*. No. 72

## U. S. NATIONAL MUSEUM—DIVISION OF MOLLUSKS

## Pelecypoda

- Nuculana hamata* described as *Leda*. No. 107420  
*Huxleyia munita* (Dall) [= *Pleurodon munita* Carpenter ms.]. No. 23243  
*Glycymeris subobsoleta* described as *Axinaca*. No. 15594  
*Philobrya setosa* described as *Bryophila*. No. 16187  
*Pecten circularis aequisulcatus* described as *P. ventricosus* var. *aequisulcatus*. No. 15645  
*Pandora bicarinata* Carpenter = *P. bilirata* Conrad. No. 592440  
*Pandora filosa* described as *Kennerlia*. No. 4542  
*Cuspidaria pectinata* described as *Neaera*. No. 4506  
*Leiomya scabra* described as *Plectodon*. No. 592441  
*Astarte compacta*. No. 4509  
*Eucrassatella fluctuata* described as *Astarte*. No. 1060  
*Glans subquadrata* described as *Lazaria*. No. 15681  
*Miodontiscus prolongatus* described as *Miodon*. No. 15472 ; also Redpath Museum  
*Axinopsida sericata* described as *Cryptodon*. No. 5249 ; also Redpath Museum  
*Lucina tenuisculpta*. No. 5244  
*Kellia lapeousii chironii*. No. 15460  
*Mysella tumida*, described as *Tellimya*. No. 5242  
*Pristes oblongus* No. 15592  
*Pseudopythina rugifera*, described as *Pythina*. No. 4445  
*Lepton meroeum*, described as *Lepton*. No. 15591

- Nemocardium centifilosum*, described as *Cardium*. No. 15262  
*Compsomya subdiaphana*, described as ? *Clementia*. No. 4541  
*Psephidia salmonca*, described as *Psephis*. No. 15578; also Redpath Museum  
*Petricola tellimyalis*, described as *Psephis*. No. 15554  
*Cooperella subdiaphana*, described as *Ocdalia*. No. 3563  
*C. scintillaeformis*=*C. subdiaphana*. No. 15669  
*Tellina modesta*, described as *Angulus*. No. 4245  
*T. buttoni* Dall [= *Angulus*? var. *obtusus* Carpenter]. No. 19429  
*T. carpenteri* Dall [= *Angulus variegatus* Carpenter]. No. 15467  
*T. salmonca*, described as *Macra*. No. 73449  
*Macoma yoldiformis*. No. 4507  
*M. expansa*. No. 3910  
*M. indentata*. No. 15229  
*Sphenia ovoidca*. No. 4552  
*Corbula luteola*. No. 14897

## Gastropoda

- Puncturella cooperi*. No. 11848  
*Aemaca funiculata*, described as *Scurria*. No. 14799; [= *Scurria mitra tenuisculpta*, nomen nudum. No. 15490]  
*A. rosacca*, described as *A.* (? *pilcolus* var.). No. 15273  
*A. triangularis*. No. 14802; also Redpath Museum  
*Lepeta caecoides*. No. 11849  
*Margarites lacunatus*, described as *Gibbula*. No. 15535b  
*M. acuticostatus*, described as *Margarita*. No. 16280  
*M. funiculatus*, described as *Gibbula*. No. 15534b  
*M. inflatulus* Dall=*Margarita inflata* Carpenter No. 4494  
*M. lirulatus*, described as *Margarita*. No. 4191  
*M. lirulatus conicus*, described as *Margarita*. No. 4191a  
*M. lirulatus obsoletus*, described as *Margarita*. No. 15537e  
*M. lirulatus subelevatus*, described as *Margarita*. No. 15537  
*M. optabilis*, described as *Gibbula*. No. 15287  
*M. parcipictus*, described as *Gibbula*. No. 31114  
*M. salmoncus*, described as *Margarita*. No. 16279  
*M. rhodia* Dall=*Margarita inflata* Carpenter in part. No. 15585, lectotype  
*M. succinctus*, described as *Gibbula*. No. 15562  
*Cidarina cidaris* (Adams in Carpenter), described as *Margarita*. No. 15600  
*Solarrella peramabilis*. No. 16281  
*Calliostoma gemmulatum*=*C. formosum*. Questionable type, No. 16261  
*C. supragranosum*. No. 14925  
*C. splendens*. No. 16278  
*C. variegatum*. No. 4201  
*Tegula funebris subaperta*, described as *Chlorostoma*. No. 123496  
*Halistylus pupoides* described as *Fenella*. No. 14824  
*Cythna albida*, described as *Cythna*. No. 15569  
*Teinostoma supravallatum*, described as *Ethalia*. No. 15574  
*T. invallatum*, described as *Ethalia*. No. 15574b  
*Arcue acuticostata*, described as *Liotia*. No. 16282, lectotype  
*Liotia fencstrata*. No. 16283, lectotype  
*Homalopoma baculum*, described as *Leptonyx*. No. 16284  
*Imperator serratus* Carpenter=*Astraca uindosa* (Wood) young. No. 11832  
*Phasianella substriata*, described as *P.* (*Eucosmia*) (? *variegata*, var.). No. 11829  
*P. compta punctulata*. No. 11288

- P. pulloides*. No. 14814 (16285–16386)  
*P. pulloides elatior*. No. 16287  
*Lacuna solidula compacta*. No. 15530b  
*L. porrecta exaequata*. No. 15532  
*L. porrecta effusa*. No. 15533  
*L. porrecta*. No. 15549b  
*L. unifasciata*. No. 16257  
*L. variegata*. No. 15531  
 “*Littorina castanea*.” No. 16290. Described as ? *Paludinella*  
*L. subrotundata*, described as *Assiminca*. No. 15586  
*Amphithalamus inclusus*. No. 15573x  
*A. lacunatus*. No. 15564  
*Alvania filosa*. No. 36632  
*A. carpenteri* (Weinkauff) [= *A. reticulata* Carpenter] No. 17728, lectotype  
*A. compacta*, described as *Rissoa*. No. 4338  
*Barleccia haliotiphila*. No. 15558  
*B. marmorca*, described as *Diala*. No. 14821  
*Tachyrhynchus lacteolum*, described as *Mesalia*. No. 4195  
*T. lacteolum subplanatum* described as *Mesalia*. No. 4195b  
*Petalocochus compactus*, described as *Bivonia*. No. 13580  
*Caecum californicum* Dall = *C. cooperi* Carpenter, No. 15719  
*Micranellum crebricinctum*, described as *Cacum*. No. 14930  
*Diala acuta*. Early California State Survey, No. 390  
*Bittium armillatum*. No. 15653; also Redpath Museum  
*B. attenuatum*. No. 15584; [= *B. esuriens*, No. 14832]  
*B. purpurcum*, described as *Cerithiopsis*. No. 14823  
*B. quadrifilatum*. No. 14849 (14935)  
*B. rugatum*. No. 7154  
*B. interfossa*, described as *Rissoina*. No. 224860  
*B. munitum*, described as *Cerithiopsis*. No. 15501a, b  
*Alabina tenuisculpta*, described as *Mesalia*. No. 14933  
*A. turrita*, described as *Styliferina*. No. 15566  
*Cerithiopsis columna*. No. 14823b  
*Epitonium indianorum*, described as *Scalaria*. No. 15521, lectotype  
*E. subcoronatum*, described as *Scalaria*. No. 14830b (15732)  
*E. tinctum*, described as *Scalaria*. No. 19510, lectotype  
*E. bellistriatum*, described as *Scalaria*. No. 14831b, lectotype  
*Opalia pluricosta* ms. Carpenter = *O. montereyensis* Dall. No. 23397  
*Opalia spongiosa*. No. 14830; = *O. retiporosa*. No. 11843 = *O. bullata* Redpath Museum.  
 No. 76  
*Balcis compacta*, described as *Eulima*. No. 13517b  
*B. thersites*, described as *Eulima*. No. 11795  
*B. rutila*, described as *Eulima*. No. 14928  
*B. micans*, described as *Eulima*. No. 14850  
*Odostomia callimorpha* Dall and Bartsch = *Chrysallida pumila* Cpr. No. 15565  
*Odostomia cincta*, described as *Chrysallida*. No. 15730  
*O. inflata*. No. 15521b, lectotype (= *O. jcwetti* Dall and Bartsch)  
*O. tenuisculpta*. No. 15520 (See also *O. satura*)  
*O. gouldii*. No. 22821  
*O. acellana*. No. 15517b  
*O. nuciformis*. No. 15517a  
*O. satura*. No. 15520 (See also *O. tenuisculpta*.) = *O. pupiformis*. No. 15520a  
*O. jcwetti* Dall and Bartsch = *O. inflata* Carpenter in part. No. 15521c  
 “*Chemnitzia subcuspidata*” = *Turbonilla tenuicula* Gould in part. No. 14829

- Turbonilla virgo*, described as *Chemnitzia*. No. 73993  
*T. aurantia*, described as *Chemnitzia*. No. 4493b  
*T. styliana*, described as *Chemnitzia torquata* ? var. *styliana*. No. 14829. Also Redpath Museum  
*T. tridentata*, described as *Chemnitzia*. No. 15315b  
*Iselica fenestrata*, described as *Isapis*. No. 15772 and 15775  
*I. obtusa*, described as *Isapis*. No. 14814 (14936)  
*Calyptrea contorta*, described as *Galerus*. No. 11846  
*Hipponix tumens*. No. 14929 (14817b, 15293, 15652, 15715)  
*H. antiquatus cranioides*. No. 15508 (15508Q)  
*Volutina prolongata*. No. 11842  
*Ocenebra interfossa*. No. 4636  
*O. interfossa atropurpurea*. No. 15528b  
*Trophonopsis triangulatus*, described as *Trophon*. No. 11839 paratype; also Univ. California  
*Exilioidea rectirostris*, described as *Chrysodomus*. No. 4515  
*Amphissa undata*, described as *Amycla*. No. 23284  
*Anachis penicillata*. No. 15576, lectotype  
*A. subturrita*. No. 14952  
*Aesopis chrysalloides*, described as *Amycla*. No. 14953 (15325C)  
*Gibberulina pyriformis*, described as *Volutella*. No. 14950, lectotype; also Redpath Museum  
*Cystiscus regularis*, described as *Marginella*. No. 55391, lectotype; also Redpath Museum  
*Ophiodermella incisa*, described as *Drillia*. No. 6320  
“*Mangelia*” *levidensis*. No. 4487  
*M. crebricostata*. No. 15512b  
*M. interfossa*. No. 22818; also Redpath Museum  
*M. variegata*. No. 11798; also Redpath Museum  
*Pseudomelatomia mocsta*, described as *Drillia*. No. 14942  
*P. torosa*, described as *Drillia*. No. 3286  
*P. torosa aurantia*, described as *Drillia*. No. 15310  
*Granotoma excurvata*, described as *Bela*. No. 4493C  
*Propebela tabulata*, described as ? *Mangelia*. No. 19403; also Redpath Museum  
*Mitromorpha aspera*, described as ? *Daphnella*. No. 22816  
*Admete modesta*, described as *Cancellaria*. No. 16238  
*Terebra* “*philippiana*” Dall=*Myurella simplex* Carpenter. No. 4943  
*Acteon punctocaelatus*, described as *Tornatella*. No. 14914  
*Atys casta*. No. 4014.  
*Cylichna attonsa*, described as *C.* (? *cylindricea* var.). No. 4495  
*Williamia peltoides*, described as *Nacella*. No. 4023; also Redpath Museum  
*Nacella subspiralis*=*Williamia peltoides*. Lost

## Scaphopoda

*Dentalium rectius*. No. 5283

## Amphineura

*Leptochiton internexus* Carpenter in Pilsbry, described as *Lepidopleurus*. No. 30750

*L. nexus*. No. 16270

*Nuttallina fluxa*, described as *Acanthopleura*. No. 15690b

*Ichnochiton radians* Carpenter in Pilsbry. No. 19471, also Redpath Museum

*I. retiporosus*. No. 4499

*I. scabricostatus*. No. 16268

*I. trifidus*, described as *Trachydermon*. No. 30946.

*I. veredentiens*. No. 16259

*Dendrochiton gothica*, described as *Ischnochiton*. No. 16271; also Redpath Museum  
*Mopalia impercata*. No. 4499; also Redpath Museum  
*M. sinuata*. No. 4473; also Redpath Museum

## LIST OF TYPES NOT FOUND

The types of the following molluscan species described by Carpenter from the West Coast (San Diego to Puget Sound) have not been found.

## Pelecypoda

*Ostrea lurida expansa*  
*O. lurida laticaudata*  
*O. lurida rufoides*  
*Pecten Hindsii*, see *P. rubidus* Hinds  
*Modiola nitens*  
*Adula stylina* Cpr. [= *Adula californiensis* (Philippi)]  
*Kellia rotundata*  
*Protothaca lacinata*, described as *Tapes*  
*P. staminea* (Conrad) forma *orbella*  
*P. tenerima*, described as *Tapes*  
*Solen rosaceus*

## Gastropoda

*Acmaea limatula*  
 "Acmaea strigillata Nuttall"  
*Margarites tenuisculptus*, described as *Margarita* (? v. [*Vahlii*]) *tenuisculpta*  
*Calliostoma formosum*=*C. gemmulatum*, type questionable  
*Trochicus convexus*=*Norrisia norrisii* (Sowerby), young  
*Lacuna unifasciata aurantiaca*  
*Barlecia subtenuis*  
*B. subtenuis rimata*  
*Assiminea translucens*, described as *Jeffreysia*  
*Turritella cooperi*  
*T. jewetti*  
*Aletes squamigerus*  
*Diastoma fastigiatum*, described as *Bittium*  
 "Epitonium crebricostatum," described as *Scalaria*  
*E. tiara*, described as *Scalaria*  
*Turbonilla laminata*, described as *Dunkeria*  
*T. chocolata*, described as *Chemnitzia*  
*Calicantharus fortis*, described as *Pisania*  
*Mitrella gouldii*  
*Nassarius insculptus*, described as *Nassa*  
*Ophiodermella cancellata*, described as *Drillia*  
 "? *Daphnella effusa*"  
*Siphonaria thersites*

## Amphineura

*Ischnochiton decipiens* Carpenter in Pilsbry  
*Mopalia muscosa kennerleyi*  
*M. swanii*  
*Basilochiton flectens*, described as *Ischnochiton*

PRESENT-DAY CARPENTER MATERIAL  
SPECIES AS LISTED BY DALL (1921) AND THE PRESENT REPORT

Names in roman type are synonymus.

Dall, 1921 (by generic name) Present Report (by generic name)

## PELECYPODA

<i>Solemya valvulus*</i>	<i>S. valvulus*</i>
<i>Leda hamata</i>	<i>Nuculana hamata</i>
<i>Cyrella munita</i> (Carpenter) Dall	<i>Huxleyia munita</i> (Dall)
<i>Glycymeris subobsoleta</i>	<i>G. subobsoleta</i>
<i>Philobrya setosa*</i>	<i>P. setosa*</i>
<i>Ostrea palmula*</i>	<i>O. lurida laticaudata</i>
<i>O. lurida</i>	<i>O. lurida</i>
<i>O. lurida expansa</i>	<i>O. lurida expansa</i>
.....	<i>O. conchaphila*</i>
<i>Pecten hindsi</i>	<i>P. rubidus</i> Hinds
<i>P. paucicostatus*</i>	.....
<i>P. circularis aequisulcatus</i>	<i>P. circularis aequisulcatus</i>
<i>Modiolus fornicatus</i>	<i>Modiolus fornicatus</i>
<i>Asthenothaerus villosior*</i>	<i>A. villosior*</i>
<i>Kennerlia filosa</i>	<i>Pandora filosa</i>
<i>Cuspidaria pectinata</i>	<i>C. pectinata</i>
<i>Plectodon scaber</i>	<i>Lciomya scabra</i>
<i>Astarte compacta</i>	<i>A. compacta</i>
<i>Crassatellites fluctuatus</i>	<i>Eucrassatella fluctuata</i>
<i>Cardita subquadrata</i>	<i>Glans subquadrata</i>
<i>Venericardia prolongatus</i>	<i>Miodontiscus prolongatus</i>
<i>Axinopsis sericatus</i>	<i>Axinopsida sericata</i>
<i>Diplodonta subquadrata*</i>	<i>Taras subquadratus*</i>
.....	<i>Lucina excavata*</i>
<i>Parvilucina tenuisculpta</i>	<i>Lucina tenuisculpta</i>
.....	<i>Kellia laperousii chironii</i>
<i>Rocheportia tumida</i>	<i>Mysella tumida</i>
<i>Serridens oblonga</i>	<i>Pristes oblongus</i>
<i>Pseudopythina rugifera</i>	<i>P. rugifera</i>
<i>Lepton meroëum</i>	<i>L. meroëum</i>
<i>Protocardia centifilosa</i>	<i>Nemocardium centifilosum</i>
<i>Marcia kennerlyi</i> Carpenter, Reeve	<i>Humiliaria kennerleyi</i> (Reeve)
<i>M. subdiaphana</i>	<i>Compsomyx subdiaphana</i>
<i>Protothaca tenerrima</i>	<i>P. tenerrima</i>
<i>P. staminea laciniata</i>	<i>P. laciniata</i>
<i>P. staminea orbella</i>	<i>P. staminea forma orbella</i>
? <i>Psephidia salmonea</i>	<i>P. salmonea</i>
<i>Petricola denticulata</i> Sowerby, Dall in part	<i>P. tellimyialis</i>
<i>Cooperella subdiaphana</i>	<i>C. subdiaphana</i>
<i>Tellina lamellata*</i>	<i>T. lamellata*</i>
<i>T. salmonea</i>	<i>T. salmonea</i>
<i>T. carpenteri</i> Dall= <i>Angulus variegatus</i> Car- penter	<i>T. carpenteri</i> (Dall)
<i>T. modesta</i>	<i>T. modesta</i>
<i>T. buttoni</i> Dall= <i>Angulus obtusus</i> Carpenter	<i>T. buttoni</i> (Dall)
<i>Metis alta</i> Conrad	<i>Apolymetis biangulata</i>

\* Species, the type locality of which is not in the limits of the present report.



*Macoma expansa*  
*M. yoldiformis*  
*Macoma indentata*  
*Semele incongrua*  
*Gobraeus regularis\**  
*Solen rosaceus*  
 -----  
*Sphenia fragilis\**  
*S. ovoidea*  
*Corbula luteola*  
*Martesia intercalata\**

*M. expansa*  
*M. yoldiformis*  
*M. indentata*  
*S. incongrua*  
*Gari regularis\**  
*S. rosaceus*  
*Tagelus politus\**  
*S. fragilis\**  
*S. ovoidea*  
*C. luteola*  
*M. intercalata\**

## SCAPHOPODA

*Dentalium rectius*

*D. rectius*

## GASTROPODA

*Acteon punctocoelata*  
*Acteocina carinata\**  
*A. planata*  
*Volvulella cylindrica*  
*Atys casta\**  
*Cylichnella attonsa*  
*Melampus olivaceus\**  
*Siphonaria thersites*  
*Williamia peltoides\**  
*Melampus olivaceus*  
*Terebra pedroanum philippianum* Dall  
 = *T. simplex* Carpenter  
*Clathrodrillia incisa*  
*C. rhines* Dall = *Drillia cancellata* Carpenter  
*Pseudomclatoma moesta*  
*P. torosa*  
*P. aurantia*  
*Lora tabulata*  
*L. excurvata*  
*Mangilia angulata*  
*M. pulchrior* Dall  
*M. interfossa*  
*M. crebricostata*  
*M. levidensis*  
 -----  
*Cytherea fusconotata*  
*Cancellaria modesta*  
*Admete couthouyi gracilior*  
*Olivella boetica*  
*Marginella jewetti*  
*M. subtrigona*  
*M. regularis*  
*Cypracolina pryiformis*  
*Mitromorpha aspera*  
*M. filosa*  
 -----  
*Exilia rectirostris*

*A. punctocaelatus*  
*Colcophysis carinata\**  
*A. inculta* (Gould)  
*V. cylindrica*  
*A. casta\**  
*Cylichna attonsa*  
*M. olivaceus\**  
*S. thersites*  
*W. peltoides\** (includes *Nacella subspiralis*)  
*M. olivaceus*  
*T. "philippiana* Dall"  
  
*Ophiodermella incisa*  
*Ophiodermella cancellata*  
*P. moesta*  
*P. torosa*  
*P. torosa aurantia*  
*Propebela tabulata*  
*Granotoma excurvata*  
*Mangelia barbarensis* Oldroyd *et al.*  
*Mangelia nitens*  
*M. interfossa*  
*M. crebricostata*  
*"Mangelia" levidensis*  
*Mangelia variegata*  
*C. fusconotata*  
*Admete modesta*  
*Admete gracilior* (fossil only)  
*O. boetica* Marrat *in* Sowerby  
*Cystiscus jewetti*  
*C. subtrigona*  
*C. regularis*  
*Gibberulina pryiformis*  
*M. aspera*  
*M. filosa*  
*"? Daphnella effusa"*  
*Exilioidea rectirostris*

<i>Alectrion insculptus</i>	<i>Nassarius insculptus</i>
<i>Anachis penicillata</i>	<i>A. penicillata</i>
<i>Anachis subturrita</i>	<i>A. subturrita</i>
<i>Columbella tuberosa</i>	<i>Mitrella tuberosa</i>
<i>Nitidella gouldii</i>	<i>M. gouldii</i>
<i>Aesopus eurytoides*</i>	<i>A. eurytoides*</i>
<i>A. chrysalloides</i>	<i>A. chrysalloides</i>
<i>Amphissa undata</i>	<i>A. undata</i>
<i>Tritonalia lurida munda</i>	<i>T. lurida munda</i> Dall in Williamson
<i>T. squamulifera</i>	<i>Ocenebra squamulifera</i>
<i>T. poulsoni</i>	<i>O. poulsoni</i>
<i>T. interfossa</i>	<i>O. interfossa</i>
<i>T. interfossa (alpha)</i> (Carpenter) Dall	[Dall, not Carpenter]
<i>T. interfossa (beta)</i> (Carpenter) Dall	[Dall, not Carpenter]
<i>T. interfossa atropurpurea</i> (Carpenter) Dall	[Carpenter, not Dall]
<i>Trophon triangulatus</i>	<i>Trophonopsis triangularis</i>
<i>T. tenuisculpta</i>	<i>Ocenebra tenuisculpta</i> (fossil not Recent)
<i>Coralliophila hindsii*</i>	.....
<i>Epitonium spongiosum</i>	<i>Opalia spongiosa</i>
<i>E. retiporosum</i>	See <i>O. spongiosa</i>
<i>E. bellastriatum</i>	<i>E. bellastriatum</i>
<i>E. indianorum</i>	<i>E. indianorum</i>
<i>E. tinctum</i>	<i>E. tinctum</i>
<i>E. subcoronata</i>	<i>E. subcoronatum</i>
<i>E. crebricostata</i>	.....
<i>E. tiara</i>	<i>E. tiara</i>
.....	<i>Opalia insculpta</i>
<i>Melanella thersites</i>	<i>Balcis thersites</i>
<i>M. micans</i>	<i>Balcis micans</i>
<i>Alabina tenuisculpta</i>	<i>A. tenuisculpta</i>
<i>Bittium attenuatum</i>	<i>B. attenuatum</i>
<i>B. rugatum</i>	<i>B. rugatum</i>
<i>B. quadrifilatum</i>	<i>B. quadrifilatum</i>
<i>B. armillatum</i>	<i>B. armillatum</i>
<i>B. purpureum</i>	<i>B. purpureum</i>
<i>B. interfossa</i>	<i>B. interfossa</i>
<i>B. munitum</i>	<i>B. munitum</i>
.....	<i>Cerithidea hegewischii albonodosa</i>
<i>Micranellum crebricinctum</i>	<i>M. crebricinctum</i>
<i>Bivonia compacta</i>	<i>Petalonchus compactus</i>
<i>Aletes squamigerus</i>	<i>A. squamigerus</i>
<i>Petalonchus macrophragma</i>	<i>P. macrophragma</i>
<i>Turritella jexvetti</i>	<i>T. jexvetti</i>
<i>T. cooperi</i>	<i>T. cooperi</i>
<i>Tachyrhynchus lacteolus</i>	<i>T. lacteolum</i>
<i>T. lacteolus subplanatum</i>	<i>T. lacteolum subplanatum</i>
<i>Littorina subrotundata</i>	<i>L. subrotundata</i>
<i>L. castanea</i>	" <i>L. castanea</i> "
.....	<i>L. scutulata pullata*</i>
<i>Lacuna porrecta</i>	<i>L. porrecta</i>
<i>L. porrecta effusa</i>	<i>L. porrecta effusa</i>

\* Species, the type locality of which is not in the limits of the present report.

<i>L. porrecta exaequata</i>	<i>L. porrecta exaequata</i>
<i>L. porrecta puteoloides</i> (Carpenter ms.) Dall	<i>L. puteoloides</i> Dall
<i>L. divaricata</i> Fabricius	" <i>L. solidula compacta</i> " in part
<i>L. variegata</i>	<i>L. variegata</i>
<i>L. unifasciata</i>	<i>L. unifasciata</i>
<i>Lacuna unifasciata aurantiaca</i>	<i>L. unifasciata aurantiaca</i>
<i>Fossarus parcipictus</i>	.....
<i>Iselica fenestrata</i>	<i>I. fenestrata</i>
<i>I. obtusa</i>	<i>I. obtusa</i>
<i>Diala acuta</i>	<i>D. acuta</i>
<i>D. marmorea</i>	<i>Barleeia marmorea</i>
<i>Barleeia haliotiphila</i> *	<i>B. haliotiphila</i> *
<i>B. subtenuis</i>	<i>B. subtenuis</i>
<i>B. subtenuis rimata</i>	<i>B. subtenuis rimata</i>
<i>Amphithalamus inclusus</i>	<i>A. inclusus</i>
<i>A. lacunatus</i>	<i>A. lacunatus</i>
<i>Alvania carpenteri</i> Weinkauff = <i>A.</i> <i>reticulata</i> Carpenter	<i>A. carpenteri</i> Weinkauff
<i>A. filosa</i>	<i>A. filosa</i>
<i>A. compacta</i>	<i>A. compacta</i>
<i>A. acutilirata</i>	<i>A. acutilirata</i>
<i>Syncera translucens</i>	<i>Assimineea translucens</i>
<i>Hipponix serratus</i>	( <i>H. serratus</i> )
<i>H. antiquatus cranioides</i>	<i>H. antiquatus</i>
<i>H. tumens</i>	<i>H. tumens</i>
<i>Calyptraea contorta</i>	<i>C. contorta</i>
<i>Velutina prolongata</i>	<i>V. prolongata</i>
<i>Lepeta caecoides</i>	<i>L. caecoides</i>
<i>Acmaea mitra funiculata</i>	<i>A. funiculata</i>
<i>A. cassis monticola</i>	<i>A. cassis monticola, nomen nudum</i>
<i>A. scutum cribaria</i>	<i>A. [fenestrata] cribaria</i>
<i>Acmaea limatula</i>	<i>A. limatula</i>
<i>A. persona strigillata</i>	<i>A. strigatella</i>
<i>A. rosacea</i>	<i>A. rosacea</i>
<i>A. triangularis</i>	<i>A. triangularis</i>
.....	<i>A. atrata</i> *
<i>Phasianella compta punctulata</i>	<i>P. compta punctulata</i>
<i>P. pulloides</i>	<i>P. pulloides</i>
<i>P. pulloides elatior</i>	<i>P. pulloides elatior</i>
<i>P. substriata</i> *	<i>P. substriata</i> *
<i>Leptothyra carpenteri</i> Pilsbry = <i>L.</i> <i>sanguinea</i> Cpr.	<i>Homalopoma carpenteri</i> (Pilsbry)
<i>L. bacula</i>	<i>Homalopoma baculum</i>
<i>Liotia fenestrata</i>	<i>Liotia fenestrata</i>
<i>L. acuticostata</i>	<i>Arene acuticostata</i>
<i>Halistylus subpupoides</i>	<i>H. pupoides</i>
<i>Tegula funebris subaperta</i>	<i>T. funebris subaperta</i>
<i>Calliostoma variegatum</i>	<i>C. variegatum</i>
<i>C. gemmulatum</i>	<i>C. gemmulatum</i>
<i>C. supragranosum</i>	<i>C. supragranosum</i>
<i>C. splendens</i>	<i>C. splendens</i>
<i>Cidarina cidaris</i> A. Adams	<i>C. cidaris</i> (Adams in Carpenter)
<i>Solariella peramabilis</i>	<i>S. peramabilis</i>

<i>Margarites salmoneus</i>	<i>M. salmoneus</i>
<i>M. rhodia</i> Dall = <i>M. inflata</i> Cpr. in part	<i>M. rhodia</i> Dall
<i>M. succinctus</i> *	<i>M. succinctus</i> *
<i>M. funiculatus</i>	<i>M. funiculatus</i>
<i>Margarites optabilis</i>	<i>M. optabilis</i>
<i>M. lacunatus</i>	<i>M. lacunatus</i>
<i>M. parcipictus</i>	<i>M. parcipictus</i>
<i>M. inflatula</i> Dall = <i>M. inflata</i> Carpenter in part	<i>M. inflatulus</i> Dall
<i>M. lirulatus</i>	<i>M. lirulatus</i>
<i>M. lirulatus conicus</i>	<i>M. lirulatus conicus</i>
<i>M. lirulatus obsoletus</i>	<i>M. lirulatus obsoletus</i>
<i>M. lirulatus subelevatus</i>	<i>M. lirulatus subelevatus</i>
<i>M. acuticostatus</i>	<i>M. acuticostatus</i>
<i>M. (vahlii var.?) tenuisculptus</i>	<i>M. tenuisculptus</i>
<i>Teinostoma supravallata</i>	<i>T. supravallatum</i>
<i>T. invallata</i>	<i>T. invallatum</i>
<i>Lucapinella callomarginata</i> (Carpenter ms.) Dall	<i>L. callomarginata</i> (Dall)
<i>Diadora murina</i> (Carpenter ms.) Dall	<i>Diadora murina</i> (Arnold)
<i>Puncturella cooperi</i>	<i>P. cooperi</i>

## AMPHINEURA

<i>Lepidopleurus rugatus</i> *	<i>Leptochiton rugatus</i> *
<i>L. internexus</i>	<i>L. internexus</i> Carpenter in Pilsbry
<i>L. nexus</i>	<i>L. nexus</i>
<i>Lepidochitona flectens</i>	<i>Basiliochiton flectens</i>
<i>L. hartwegii</i>	<i>Cyanoplax hartwegii</i>
<i>Nuttallina fluxa</i>	<i>N. fluxa</i>
<i>Ischnochiton fallax</i>	<i>I. fallax</i> Carpenter in Pilsbry
<i>I. acrior</i>	<i>I. acrior</i> Pilsbry
<i>I. conspicua</i>	<i>I. conspicuus</i> "Dall" Pilsbry
<i>Ischnochiton retiporosus</i>	<i>I. retiporosus</i>
<i>I. radians</i>	<i>I. radians</i> Carpenter in Pilsbry
<i>I. scabricostatus</i>	<i>I. scabricostatus</i>
<i>I. aureotinctus</i>	<i>I. aureotinctus</i> Carpenter in Pilsbry
<i>I. veredentiens</i>	<i>I. veredentiens</i>
<i>I. newcombi</i>	<i>I. newcombi</i> Carpenter in Pilsbry
<i>I. serratus</i> *	<i>I. serratus</i> *
<i>I. corrugatus</i>	<i>I. corrugatus</i> Carpenter in Pilsbry
<i>I. cooperi</i>	<i>I. cooperi</i> "Dall" Pilsbry
<i>I. cooperi acutior</i> * (Carpenter ms.) Dall	<i>I. cooperi acutior</i> "Dall"*
<i>I. decipiens</i>	<i>I. decipiens</i> Carpenter in Pilsbry
<i>I. simudentatus</i>	<i>I. simudentatus</i> Carpenter in Pilsbry
.....	<i>I. californiensis</i> Berry = <i>I. pectinatus</i> Carpenter
<i>I. regularis</i>	<i>I. regularis</i>
<i>I. trifidus</i>	<i>I. trifidus</i>
<i>Chaetopleura gemma</i>	<i>C. gemma</i> "Dall" Pilsbry
<i>C. beani</i> *	<i>C. beanii</i> *
<i>C. parallela</i> *	<i>C. parallela</i> *

\* Species, the type locality of which is not in the limits of the present report.

<i>C. prasinata</i> *	<i>C. prasinata</i> *
? <i>C. gothica</i>	<i>Dendrochiton gothicus</i>
<i>Pallochiton lanuginosus</i> (Carpenter ms.)	<i>P. lanuginosus</i> "Dall" Pilsbry*
Dall*	
<i>Callistochiton palmulatus</i>	<i>C. palmulatus</i> Carpenter in Pilsbry
<i>C. decoratus</i> *	<i>C. decoratus</i> Pilsbry*
<i>Mopalia muscosa acuta</i>	<i>M. acuta</i>
<i>M. muscosa kemnerleyi</i>	<i>M. muscosa kemnerleyi</i>
<i>M. muscosa swanii</i>	<i>M. swanii</i>
<i>Mopalia imporcata</i>	<i>M. imporcata</i>
<i>M. sinuata</i>	<i>M. sinuata</i>
<i>Placiphorella velata</i>	<i>P. velata</i> Dall
<i>Acanthochitona avicula</i>	<i>A. avicula</i>

## COLLECTIONS OF CARPENTER SPECIES

Chicago Natural History Museum  
(Identified by Philip P. Carpenter)

The following list was compiled in 1945 by Dr. Fritz Haas, Curator of Lower Invertebrates. The nomenclature is that used by Carpenter. Information regarding locality and number of specimens was added by the author in January 1951.

The Chicago Natural History Museum (then Field Columbian Museum of Chicago) purchased in 1895 a first set of duplicates of the "Philip Carpenter Collection of Shells" from the Peter Redpath Museum, McGill University. The collection consisted of 4039 specimens (Haas, personal communication, Dec. 27, 1944; see Haas, 1944, and anonymous, 1895).

No types were found among this material. Many of the specimens had early Smithsonian Institution labels and were collected by Jewett, Xantus, Swan, and J. G. Cooper. The collection is important in that it is a primary source of Carpenter identifications of specimens made by the original collectors. Where the type has not been found, as in *Turritella cooperi*, the shells would be available from which to choose a neotype. The collection would also furnish additional specimens of original material by which one is able to obtain a better concept of what Carpenter considered the species to be if only the holotype or a few syntypes were available. The list is inserted to give the present location of source material for those who are interested in comprehensive work on species or genera.

The spelling, abbreviations, and punctuation of the specific names and localities are given as on the original labels.

Genus and Species	Number of Specimens	Locality	Catalogue Number
<i>Acmaea</i> [? <i>pileolus</i> , Midd.]			
var. <i>rosacea</i>		Monterey	5868
<i>Adula styliana</i>	1 double	Between Vancouver & Calif.	6250
<i>Alaba supralirata</i>	1	Cape San Lucas, Xantus	8255
<i>Alvania excurvata</i>	1	Mazatlan	8291
<i>Amycla tuberosa</i>		"Sta. Barbara: fossil"	7596, 7671

Genus and Species	Number of Specimens	Locality	Catalogue Number
<i>Anachis (costellata ?) var. pachyderma</i>	4	Mazatlan	4700
<i>Angulus (Moerella) salmoneus</i>	4½ double	Neah Bay, Swan	7163
<i>Aplexa aurantia</i>	4	Mazatlan	11400
<i>Bittium ? var. esuriens</i>	10	Neah Bay, Swan	5053
<i>Bittium fastigiatum</i>	1	Sta. Barbara, Jewett	7428
<i>Bittium quadrifilatum</i>	1	San Diego	5050
<i>Bittium rugatum</i>	1	Sta. Barbara, Jewett	7429
<i>Bivonia compacta</i> on <i>Pachypoma gibberosum</i>		Neah Bay Vancouver	20102
<i>Bryophila setosa</i>	1 double	Cape San Lucas, Xantus	6191
<i>Bulla adamsi</i> "Menke"	1	Mazatlan	7282
<i>Caecum cooperi</i>	1	Catalina Isl.	8275
<i>Caecum crebricinctum</i>	1	Monterey	8277
<i>Caecum (Fartulum) dextroversum</i>	1	Mazatlan	5132
<i>Caecum (Anellum) elegantissimum</i>	1	Tenerife Canaries, R. M. Andrew leg.	5142
<i>Caecum (Fartulum) farcimen</i>	1	Mazatlan	5134
<i>Caecum (Anellum) undatum</i>	3	Mazatlan	5134, 6055
<i>Caecum (Fartulum) vitreum</i>	1	Tenerife Canaries R. M. Andrew leg.	5141
<i>Caecum (Fartulum) [vitreum var.] clarkii</i>		Tenerife Canaries R. M. Andrew leg.	5139
<i>Callista puella</i>	5 double plus singles	C. S. L.	6667
<i>Cerithidea ? varicosa</i> Sow. bar. <i>Mazatlanica</i>		Mazatlan	5068, 7739
<i>Cerithiopsis columna</i>		Monterey, Calif. J. G. Cooper	7711
<i>Cerithiopsis munita</i>	7	Swan	5071
<i>Cerithiopsis purpurea</i>	1	Sta. Barbara, Jewett	7709
<i>Chama frondosa</i> var. <i>mexicana</i>	1 valve	Mazatlan	6627, 6639
<i>Chrysallida fasciata</i>	1	Mazatlan	5435
<i>Chrysallida ovulum</i>	2	Mazatlan	5436
<i>Chrysallida telescopium</i>	1	Mazatlan	5437
<i>Circe subtrigona</i>	1 tiny valve	Mazatlan	6698
<i>Columbella Sta-barbarensis</i>		C. S. L. Xantus	7730
<i>Crenella coarctata</i>	1	Mazatlan	6279
<i>Cyrena olivacea</i>	1 double	Mazatlan	6843
? <i>Daphnella aspera</i>	1	Monterey	7367
<i>Diala marmorea</i>	3	Monterey	8267
<i>Donax culminatus</i>	1 double	Mazatlan	6882
<i>Donax ? punctulostratus</i> var. <i>caelatus</i>	1 double	Mazatlan	6687
<i>Drillia aterrima</i> Sowerby var. <i>melchersi</i>	16	Mazatlan	4271, 7401
<i>Drillia torosa</i>	2	Monterey	7385
<i>Fissurella alba</i>	4	Mazatlan	5821
<i>Glyphis saturnalis</i>	1	C. S. L.	5809
<i>Hipponyx cranioides</i>	3	Neah Bay	5316
<i>Hipponyx serratus</i>	2	Mazatlan	5319
<i>Isapis fenestrata</i>	1	Neah Bay, Swan	13158
<i>Jeffreysia bifasciata</i>	1	Mazatlan	5221
<i>Lacuna ? var. compacta</i>	4	Neah Bay, Swan	8203
<i>Lacuna ? var. effusa</i>	1	Neah Bay, Swan	8204
<i>Lacuna porrecta</i>	12	Vancouver	5215
<i>Lacuna variegata</i>	10	Neah Bay	5211
<i>Leiostraca ? distorta</i> var. <i>yod</i>	1	Mazatlan	5421
<i>Leptochiton granoliratus</i>	1	Moyador, Morocco, McAndrew	5915
<i>Litorina penicillata</i>	10	C. S. L.	5197
<i>Litorina philippii</i>	3 1 operculum	Mazatlan	8159

Genus and Species	Number of Specimens	Locality	Catalogue Number
<i>Litorina pullata</i>	2	C. S. L. Xantus	8188
<i>Lucina lingualis</i>	1 double		
	2 valves	C. S. L., Xantus	7098
<i>Lucina undata</i>	2 doubles	Gulf of Calif.	7096
<i>Lucina tenuisculpta</i>	1 left valve	Catalina Is. 30 fms.	7088
<i>Mangelia interfossa</i>	1	Vancouver, Swan	7365
<i>Mangelia levidensis</i>	3	Neah Bay, Swan	4416
<i>Mangelia tabulata</i>	2	Neah Bay, Swan	4415
<i>Margarita acuticostata</i>	5	Monterey	5725
<i>Margarita lirulata</i>	1 broken	Neah Bay, Swan	5729
<i>Margarita</i> ? var. <i>salmonea</i>	2	Monterey	5715
<i>Margarita tenuisculpta</i>	1	Neah Bay	5717
<i>Marginella jewettii</i>	1	Monterey	7336
<i>Marginella margaritula</i>	1	Mazatlan	8231
<i>Meioceras cornubovis</i>		West Indies	5137
<i>Modiola fornicata</i>	2 (1 of each valve)	Monterey	6245
<i>Modiola</i> ? <i>Braziliensis</i> var. <i>mutabilis</i>	2 doubles	Mazatlan	6232
	3 doubles		6236, 6255
<i>Murex lividus</i>	6	Mazatlan	4709,
	3		13074
<i>Murex</i> ? <i>recurvirostris</i> , var. <i>lividus</i>			4709, 13074
<i>Mytilus multiformis</i>	1 valve	Mazatlan	6223
<i>Myurella albocincta</i>	11	Mazatlan	4526,
	1		4531
<i>Nacella</i> ? var. <i>triangularis</i>	small 1 broken	Monterey	5901, 5901A-19468
<i>Nassa insculpta</i>	1	Catalina Isl., J. G. Cooper	12993
<i>Nitidella gouldi</i>	3	Neah Bay	4693
<i>Ocenebra interfossa</i>	1	Vancouver Swan	4745
<i>Ocenebra lurida</i> var. <i>munda</i>	15	Neah Bay	4744
<i>Odostomia inflata</i> jun.	1	Sta. Barbara, Jewett	5448
<i>Odostomia nuciformis</i>	1	Neah Bay, Swan	5446
<i>Omphalius</i> ? <i>rugosus</i> var. <i>rufotinctus</i>	3	Mazatlan	5692
<i>Ostrea conchaphila</i>	1 valve	Mazatlan	6056
	1 valve		6058
<i>Petalocochus macrophragma</i>	1	Mazatlan	8211
<i>Phasianella</i> (? <i>compta</i> var.) <i>elatior</i>	1	Sta. Barbara, Jewett	7726
<i>Phasianella</i> (? <i>compta</i> var.) <i>pulloides</i>	4	Monterey	5551
<i>Planorbis tumens</i>	2	Mazatlan	4476,
	1		7817
<i>Rissoa compacta</i>	1	Neah Bay, Swan	8309
<i>Rissoina woodwardii</i>	1	Mazatlan	7523
<i>Scalaria indianorum</i>	13 some broken	Neah Bay	8454
<i>Truncaria eurytoides</i>	3	C. S. L.	4683
<i>Turritella cooperi</i>	1	San Pedro, Calif.	5118
<i>Vanikoro cryptophila</i>	1	Mazatlan	5354

Museum of Comparative Zoölogy  
Identified by P. P. Carpenter\*

At the Museum of Comparative Zoölogy at Harvard University, there are specimens which represent original Smithsonian Institution and California Geo-

\*This list includes only those specimens pertaining to the area of this report. Compiled by the author in 1946 from original labels. Spelling and form are as on labels.

logical Survey (J. G. Cooper) material. Some were included in the C. B. Adams collection and acquired from Amherst College. Some came from the Peabody Museum at Salem. The specimens were labelled "cotypes," but they do not belong in that category. Some have the original Smithsonian labels, such as "collected by Indian children at Neeah [*sic*] Bay, W. T. and Vancouver by Mr. J. G. Swan teacher." These labels, as has been explained previously, definitely date the collections and source, but they cannot, unless otherwise indicated, be classed as Carpenter types. By comparing the list included with that of the missing types, a few might serve as a source of neotypes. There were about 19 at the time of an examination of the collection in 1946. More specimens may be found later which were originally labelled or indicated by Carpenter as "type." Some had original notes signed by Carpenter. The specimens were either of extraneous, obscure, or manuscript types which did not enter into the subject of this report.

Genus and Species	Number of Specimens	Locality	Catalogue Number
<i>Kellia Laperousii</i> Desh.			
var. <i>chironii</i>	1	S. Francisco, Cooper	Cooper Coll. 144
<i>Moera salmonea</i>	3	Neeah Bay [ <i>sic</i> ], Swan	156378
<i>Moera obtusa</i>	none	Str. Fuca to San Diego	29315
<i>Angulus obtusus</i>	1	S. Diego, J. G. Cooper	Cooper Coll. 58
<i>Macoma indentata</i>	3	Monterey	29325
<i>M. yoldiformis</i>	2	Santa Cruz, Cooper	Cooper 51
<i>M. yoldiformis</i>	1	San Pedro	Cooper 51
<i>Ostrea</i> (? <i>lurida</i> Cpr. var.) <i>rufoides</i>	1	Cal. Smith. Coll.	
<i>Pectunculus</i> (? <i>septentrionalis</i> , var.) <i>subobsoletus</i>	2	Swan and Indian children	
<i>Dentalium rectius</i>	1	[original Smithsonian label]	
<i>Acmaea pileolus rosacea</i>	2	Santa Cruz	Cooper 455
<i>Margarita lirulata</i>	1	Neeah Bay, Swan	154167
<i>Margarita?</i> var. <i>tenuisculpta</i>	1	Neeah Bay, Swan	15168
<i>Margarita</i> (? var.) <i>salmonea</i>	7	Cooper	141186
<i>Gibbula parvipicta</i>	3	Catalina Id., J. G. Cooper	141129
<i>Gibbula succincta</i>	1	Neeah Bay	141123
<i>Leptothyra bacula</i>	1	Monterey	Cooper 482
	12		Cal. Geol. Sur. 482
<i>Leptothyra sanguinea</i>	many	Monterey, Cooper	
	3	St. Fuca	Cooper Coll.
<i>Lacuna porrecta</i> var. <i>effusa</i>	4	Neeah Bay, Swan	142817
<i>L. porrecta</i>	4	Neeah Bay, Swan	142810
	1		Cooper 193
	6	Neeah Bay, Swan	156379
<i>L. porrecta</i> var. <i>exaequata</i>	1	Neeah Bay	142809
<i>L. solidula compacta</i>	2	Neeah Bay	142809
<i>L. unifasciata</i>		Catalina, S. Cruz	Cooper
<i>L. variegata</i>	3	Neeah Bay Swan,	161281
<i>Phasianella compta punctulata</i>	1	St. Barbara, Jewett Coll.	151719
<i>Diala marmorea</i>	3	Monterey, Coll. J. G.	
		Cooper 619	142816
<i>Turritella cooperi</i>	1	S. Pedro [Smithsonian label]	
	3	Santa Barbara	548
	5	S. Pedro, Cal. Geol. Sur. 548	29222
<i>T. jewelti</i>	2	Santa Barbara, Cooper	142835
	2	Cal. Geol. Sur. 549	29399



Genus and Species	Number of Specimens	Locality	Catalogue Number
<i>Bivonia compacta</i>	2	Neeah Bay, Cooper	543
<i>Serpulorbis squamigerus</i>	2	Santa Barbara, Cooper	542
<i>Cerithiopsis munita</i>	3	Neeah Bay, Swan	161279
<i>Scalaria indianorum</i>		Swan and Indian children	
<i>Rissoa compacta</i>	2	Neeah Bay	(Acc. 1173)
	1	Neeah Bay	(Acc. 1168)
<i>Dunkeria laminata</i>	1	Cal. State Sur., Cooper	
	3	Coll. Cooper 670-133	10519
<i>Chemnitzia tenuicula</i> var. <i>subcuspidata</i>	none	S. Diego, 6 fm., Cooper	10517
<i>Hipponyx cranioides</i>	2	Neeah Bay, Swan	161278
	2	Neeah Bay, Swan	154171
<i>Ocenebra interfossa</i>	3	Neeah Bay, Swan	154169
	4	Neeah Bay, Swan	15165
	6	Vancouver, Swan	
<i>O. interfossa atropurpurea</i> Dall [The Dall label was added subsequently]	2	Swan	154170
<i>O. interfossa atropurpurea</i>	3	Catalina, Cooper	
	2	J. G. Cooper 764	
<i>O. lurida munda</i>	4	Neeah Bay, Swan	154166
<i>O. squamulifera</i>	2	San Diego, Cooper	776
	3	S. Cruz, Cooper	
<i>Mangelia tabulata</i>	1	Neeah Bay, Swan	151649
	1	Smithsonian label	156380
	2	Boston Society Natural History label	165511
<i>Nacella triangulatus</i>	2	Monterey, Cooper coll.	446
<i>Callistochiton palmulatus</i> ("Identified by P. P. Carpenter")	2	San Diego, Hemphill Coll.	2685
<i>Chaetopleura gemma</i> [copy of Carpenter label]		San Diego, Hemphill Coll.	273
<i>Chaetopleura nuttallii-Hartwegii</i>	5	San Diego, Hemphill Coll.	
<i>Isnochiton cooperi acutior</i>	10	Bolinas	
<i>Ischnoradsia regularis</i>	2	Monterey, Coll. R. E. Stearns	
<i>Leptopleurus nuttallii</i>	5	San Diego, Hemphill Coll.	

## Miscellaneous Collections

The American Museum of Natural History has two collections, Haines and Crooke, which contain Carpenter marine molluscan species. The Haines Collection was bought in about 1894, and the Crooke Collection was probably acquired at an earlier date. Although the material includes a considerable number of specimens of Carpenter species there is no record that they were identified by Carpenter except in the case of 11 species in the Haines Collection, none of which came from the area of this report. Characteristic spelling and places suggest that some of the "northwest" specimens came from original material.

The Chicago Academy of Sciences (Accession No. 35) purchased in 1894 or 1895, 3000<sup>7</sup> specimens of mollusks, worldwide, land, fresh water, and marine,

<sup>7</sup> The figures in the reference (Anonymous, 1895, p. 55) would not be 3000 "species" but specimens [1376 species].

from the Boston Society of Natural History. The shells had been identified by P. P. Carpenter. Accession No. 10 of the Chicago Academy represents 3000 specimens received from the Academy of Natural Sciences at Philadelphia in 1894. A few Carpenter species are represented in that material. An examination of the records does not reveal any original Carpenter material. The specimens of Carpenter's species were acquired after Carpenter's death and probably after 1900.

There are in the Redpath Museum duplicate specimens of species described by Carpenter from the West Coast. The Redpath Carpenter collection is in the process of rearrangement and cataloging. Many specimens were scattered, so that a complete list of Carpenter's species of this area cannot yet be made. More types will probably turn up before the work is finished (Table 1).

TABLE 1.—Type localities of species described by Carpenter from the West Coast (San Diego to Puget Sound)

	Neah Bay	Puget Sound	Vancouver Island, British Columbia	Shoal-water Bay, Washington	Islands off California	Santa Barbara	San Pedro	Monterey	San Diego	Catalina Island
<i>Pelecypoda</i>										
<i>Naculana hamata</i>	..	..	..	..	..	..	..	..	..	x
<i>Glycymeris suboboleta</i>	x	..	..	..	..	..	..	..	..	..
<i>Ostrea lurida</i>	..	..	..	x	..	..	..	..	..	..
<i>O. lurida expansa</i>	..	..	..	..	..	..	x	..	..	..
<i>O. lurida rufoides</i>	..	..	..	..	..	..	..	..	x	..
<i>Pecten circularis</i>	..	..	..	..	..	..	..	..	..	..
<i>aquisulcatusa</i>	..	..	..	..	..	..	..	..	x	..
<i>Miodolus fornicatus</i>	..	..	..	..	..	x	..	..	..	..
<i>Adula stylina</i> *†	..	..	..	..	..	..	..	..	..	..
<i>Pandora bicarinata</i> *	..	..	..	..	..	..	..	..	..	x
<i>P. filosa</i>	..	x	..	..	..	..	..	..	..	..
<i>Cuspidaria pectinata</i>	..	x	..	..	..	..	..	..	..	..
<i>Leiomya scabra</i>	..	..	..	..	..	..	..	..	..	x
<i>Astarte compacta</i>	..	..	..	..	..	..	..	..	..	..
<i>Eucrasselella fluctata</i>	..	x	..	..	..	..	..	..	..	..
<i>Glans subquadrata</i>	..	..	..	..	..	..	..	..	..	..
<i>Miodontiscus prolongatus</i>	..	..	..	..	..	..	..	x	..	..
<i>Axinopsida sericata</i>	x	x	..	..	..	..	..	..	..	..
<i>Lucina tenuisculpta</i>	..	..	..	..	..	..	..	..	..	..
<i>Kellia laperousii chironii</i>	x	..	x	..	..	..	..	..	..	..
<i>K. rotundata</i>	..	..	..	..	..	..	..	..	..	..
<i>Mysella tumida</i>	..	..	..	..	..	..	..	x	..	..
<i>Pristes oblongus</i> †	..	x	..	..	..	..	..	..	..	..
<i>Pseudopythina rugifera</i>	..	..	..	..	..	..	..	..	..	..
<i>Lepton meroëum</i>	..	x	..	..	..	..	..	..	..	..
<i>Nemocardium centifilosum</i>	..	..	..	..	..	..	..	..	x	..
<i>Compsomyax subdiaphana</i>	..	..	..	..	..	..	..	..	..	..
<i>Protothaca laciniata</i>	..	x	..	..	..	..	..	..	..	..
<i>P. tenerrima</i> †	..	..	..	..	..	..	..	..	x	..
<i>Psephidita salmonea</i>	..	..	..	..	..	..	..	..	..	..
<i>Cooperella subdiaphana</i>	..	..	..	..	..	..	..	..	..	x

\*roman = in synonymy

†type locality not definite

TABLE 1.—Type localities of species described by Carpenter from the West Coast (Continued)  
(San Diego to Puget Sound)

	Neah Bay	Puget Sound	Vancouver Island, British Columbia	Shoal-water Bay, Washington	Islands off California	Santa Barbara	San Pedro	Monterey	San Diego	Catalina Island
<i>Tellina modesta</i>	..	x	..	..	..	..	..	..	..	..
<i>T. obtusa*</i>	..	..	..	..	..	x	..	..	..	..
<i>T. salmonea</i>	x	..	..	..	..	..	..	..	..	..
<i>T. variegata*†</i>	..	..	..	..	..	..	..	..	..	..
<i>Macoma expansa</i>	..	x	..	..	..	..	..	..	..	..
<i>M. indentata</i>	..	..	..	..	..	..	x	..	..	..
<i>M. yoldiformis</i>	x	..	..	..	..	..	..	..	..	..
<i>Semele incongrua†</i>	..	..	..	..	..	..	..	..	..	..
<i>Solen rosaceus†</i>	..	x	..	..	..	..	..	..	..	..
<i>Sphenia ovoidea</i>	..	..	..	..	..	..	..	..	..	..
<i>Corbula luteola</i>	..	..	..	..	..	..	..	..	x	..
Gastropoda										
<i>Puncturella cooperi</i>	..	..	..	..	..	..	..	..	..	x
<i>Acmaea eribaria†</i>	..	..	..	..	..	..	..	..	..	..
<i>A. funiculata</i>	..	..	..	..	..	..	..	x	..	..
<i>A. limatula</i>	..	..	..	..	..	..	..	..	x	..
<i>A. mitra tenuisculpta</i>	..	x	..	..	..	..	..	..	..	..
<i>A. rosacea</i>	..	..	..	..	..	..	x	..	..	..
<i>A. triangularis</i>	..	..	..	..	..	..	..	x	..	..
<i>Velutina prolongata</i>	x	..	..	..	..	..	..	..	..	..
<i>Lepeta cacoides</i>	..	x	..	..	..	..	..	..	..	..
<i>Margarites lacunatus</i>	x	..	..	..	..	..	..	..	..	..
<i>M. acuticostatus</i>	..	..	..	..	..	..	..	..	..	x
<i>M. tenuisculptus†</i>	..	..	..	..	..	..	..	..	..	..
<i>M. funiculatus</i>	..	..	..	..	..	..	..	..	..	..
<i>M. inflatulus</i>	x	x	..	..	..	..	..	..	..	..
<i>M. lirulatus</i>	..	x	..	..	..	..	..	..	..	..
<i>M. lirulatus conicus</i>	..	x	..	..	..	..	..	..	..	..
<i>M. lirulatus obsoletus</i>	x	..	..	..	..	..	..	..	..	..
<i>M. lirulatus subelevatus</i>	x	..	..	..	..	..	..	..	..	..
<i>M. optabilis</i>	..	..	..	..	..	..	x	..	..	..













## TYPE LOCALITIES SOUTH OF SAN DIEGO

The following are species whose type locality is below San Diego (except Mazatlan) but whose range extends north.

## PELECYPODA

*Solemya vakulus*. Type locality, Cape San Lucas; type not found

*Asthenothaerus villosior*. Type locality, Cape San Lucas; type, No. 16292, U.S.N.M.

*Gari regularis* described as *Psammbobia*. Type locality, Cape San Lucas; type, No. 19407, U.S.N.M.

## GASTROPODA

*Acmaea atrata*. Type locality, Cape San Lucas; type, No. 4019, U.S.N.M.

*Acmaea strigatella*. Type locality, Cape San Lucas; type, No. 12594, U.S.N.M.

"*Phasianella carpenteri*" Dall = *Eucosmia punctata* Cpr. Type locality, Cape San Lucas; type not found

*Littorina scutulata fullata*, described as "*Littorina*." Type locality, Cape San Lucas. [Type information not completed.]

*Barlecia haliotiphila*. Type locality, Lower California; type, No. 1558, U.S.N.M.

*Odostomia acquisculpta*. Type locality, Cape San Lucas; type, No. 16221, U.S.N.M.

*Aesopus eurytoides*, described as *Truncaria*. Type locality, Cape San Lucas; type No. 4148, U.S.N.M.

*Cytharella fusconotata*, described as *Cithara*. Type locality, Cape San Lucas; type, No. 4081, U.S.N.M.

*Atys casta*. Type locality, Cape San Lucas; lectotype, No. 4014, U.S.N.M.

*Williamia peltoides*, described as *Nacella*. Type locality, Cape San Lucas, lectotype and paratype, No. 4023, U.S.N.M. Also Redpath Mus., paratype, No. 1156

## AMPHINEURA

*Chaetopleura parallela*, described as *Ischnochiton*. Type locality, Cape San Lucas; type, No. 4017, U.S.N.M., Redpath Mus., No. 46

*Chaetopleura prasinata*, described as *Ischnochiton*. Type locality, Cape San Lucas; type, No. 15892, U.S.N.M.

*Pallochiton lanuginosa* "Dall." Type locality, Todos Santos Bay; type Redpath Mus., No. 66; or if species is credited to Pilsbry, type locality Pt. Abreojos; type, No. 35684, A.N.S.P.

*Ischnochiton conspicuus* "(Dall)" Pilsbry. Type locality, La Paz, type, Redpath Mus., No. 65. San Diego, California, type, A.N.S.P., No. 35709

"*I. cooperi acutior*" Dall. Type locality, Todos Santos Bay; type, No. 30734, U.S.N.M.

*I. serratus*. Type locality, Cape San Lucas; type, No. 16204, U.S.N.M., lost; also Redpath Mus., No. 98

*I. decoratus* Pilsbry [Carpenter Dall, ms.] type locality, Todos Santos Bay; type, A.N.S.P., No. 118687

## SPECIES DESCRIBED FROM MAZATLAN WHICH RANGE NORTH

Of the molluscan species described by Carpenter from Mazatlan the range of the following has been extended into the area north of Lower California. The types of the species should be in the Reigen Collection in the British Museum. The illustration of the types of these species should be included in the future illustration of the types of the Carpenter Mazatlan Catalogue (1857a).

## PELECYPODA

*Ostrea conchaphila*

*Mytilus multiformis*

*Lucina excavata*  
*Tellina lamellata*  
*Taras subquadratus*  
*Tagelus politus*  
*Sphenia fragilis*  
*Martesia intercalata*

## GASTROPODA

*Barlecia alderi*, described as *Jeffreysia*  
*Petalocochnus macrophragma*  
*Pyramidella adamsi*  
*Turbonilla muricata* (fossil)  
*Hipponix serratus*  
*Colcophysis carinata*, described as *Tornatina*  
*Melampus olivaceus*

## AMPHINEURA

*Chaetopleura beanii*, described as *Lepidopleurus*

## NOMINA NUDA

The following names are those which were manuscript designations of Carpenter. Some have been utilized by later authors and, therefore, were validated as of that author. Some were on museum labels and have appeared in lists from that source. Others are museum labels and may or may not have been used in later identification. The list is included herein so that workers may become aware of their status readily and discontinue the use of the names in the literature.

## PELECYPODA

*Nucula suprastrata*. Not *N. suprastrata* Arnold. See *N. exigua* Sowerby, this report.  
*Cyrella munita*. See *Huxleyia munita* (Dall), this report.  
*Modiola planata*  
*Crassatella marginata*  
*Lasaea rubra subviridis*. See *Lasaea subviridis* Dall.  
*Lutricola alba* (Carpenter, 1864b, p. 639) error for *L. alta* Conrad. See *Apolymetis biangulata* Carpenter, this report.  
*Tivela marginata*  
*Tapes gracilis*

## GASTROPODA

*Acmaea cribaria*  
*A. mitra tenuisculpta*. See "*A. mitra tenuisculpta* Dall" and *A. funiculata* (Carpenter), this report.  
*Patella monticola* and/or *P. monticula* Nuttall, ms.  
*Clypidella callomarginata*. See *Lucafinella callomarginata* (Dall), this report.  
*Calliostoma costatum laqueatum*  
*Fissurella (Glyphis) murina*. See *Diodora murina* Arnold, this report.  
*Phasianella rubrilineata*. See *P. rubrilineata* Strong, this report.  
*Lacuna porrecta puteloides*. See as of Dall, this report.  
"*Alvania notabilis* Cpr." in Baker (1902)  
"*Alvania aequisculpta* Cpr." in Keep (1887) and Baker (1902). Also *Rissoa aequisculpta* and *Rissoina aequisculpta* in Baker (1902)



- "*Evalca gracilente* Cpr." Keep. See *Odostomia virginalis* Dall and Bartsch, this report.  
*Odostomia turricula*. See *O. turricula* [*turricula*] Dall and Bartsch, this report.  
*Oscilla insculpta*. See *Odostomia cucosomia* Dall and Bartsch, this report.  
*Chemnitzia castanea*. See *Turbonilla castanea* Keep, this report.  
 "Ocenebra [sic] munda." See *O. munda* Dall in Williamson, this report.  
*Ocenebra interfossa alpha*. See *O. interfossa alpha* Dall, this report.  
*O. interfossa beta*. See *O. interfossa beta* Dall, this report.  
*O. interfossa minor*. See *O. interfossa minor* Dall, this report.  
*Olivella bactica*. See *O. bactica* Marrat in Sowerby, this report.  
*Cytharrella aculea*. See *C. aculea* Dall, this report.  
 ———— *rosacca* (turrid). See *Cynatosyrinx hecubu* Dall, this report.  
*Clathrodrillia limans*. See *C. limans* Dall, this report.  
*Mitromorpha gracilis* Cpr. in Arnold (1903) and Oldroyd (1927).

## SCAPHOPODA

- Cadulus nitentior*. See *C. nitentior* Arnold, this report.  
*Siphonodentalium 4-fissatum*. See *Cadulus quadrifissatus* Pilsbry and Sharp, this report.

## AMPHINEURA

- Leptochiton crassus*  
*L. rugatus*. See *L. rugatus* Pilsbry, this report.  
*Chaetopleura gemma*. See *C. gemma* Dall or Pilsbry, this report.  
*Ischnochiton acrior*. See *I. acrior* Pilsbry, this report.  
*Maugerella conspicua*. See *I. conspicuus* ("Dall") Pilsbry, this report.  
*Ischnochiton cooperi*. See *I. cooperi* "Dall" Pilsbry, this report.  
 "I. cooperi acutior." See *I. cooperi* "Dall," this report. Type locality, Todos Santos Bay; type, No. 30734, U.S.N.M.  
*Chiton* (*Callistochiton*) *decoratus*. See *Ischnochiton decoratus* Pilsbry, this report.  
*Callistochiton fimbriatus*  
*Placiphorella velata*. See *P. velata* Dall, this report.

## EXTRANEOUS SPECIES

The following names were applied to species which were described as of the area under discussion but belong elsewhere.

- Barbatia pernoides*. Error in original label.  
*Pecten paucicostatus*. Lower California. See *P. tumbezensis* d'Orbigny, under heading *P. paucicostatus* Carpenter, this report.  
 "Pecten squarrosus"  
 "Modiola nitens"  
*Macrocallista brevisiphonata* (= *M. chishimana* Pilsbry). Japan.  
*Corbula polychroma* Carpenter in Gould and Carpenter = *C. biradiata* Sowerby. Panama or Acapulco.  
 "Columbella" *santa-barbarensis*. Lower California.  
*Patella* (? *torcuma*) *tenuilirata* "(= *Cellana radians* Gmelin)." New Zealand.  
*Natica* ? *Maroccana* var. *Californica*. Hawaiian Islands.

## STRATIGRAPHIC DISTRIBUTION OF THE SPECIES

The following tables are a compilation of the records of geologic range of species described by Carpenter for the area of this monograph. This list is not intended to represent original research nor a verification of specific determinations

as given by the 37 authors from whose works the list is compiled. The lists are given for reference to papers which report occurrence of the species other than Recent. Unless otherwise stated the mark of occurrence refers to California. Grant and Gale (1931) included the compilation of range; in many cases a note refers to their monograph. The definite localities will be found in each author's paper. In addition to the list of authors given workers should consult Burch (1947, p. 1-18) which is a discussion with charts of comparison between the mollusks of Pleistocene beds (Los Angeles County, California) with the Recent fauna.

The value of the stratigraphic column depends on the correct identification of the species. The writer cannot verify the identification made in these lists. As stated herein, it is hoped that the illustration of the type specimens will be a means of checking the identifications made in these lists. Many may be modified thereby. The list is not intended to be complete.

The following is the key to the numbers used in the stratigraphic distribution of species (Table 2).

- |  |  |
|--|--|
| 1. Woodring, Bramlette, and Kew (1946) | 19. Durham (1937)                        |
| 2. Grant and Gale (1931)               | 20. Moody (1916)                         |
| 3. Oldroyd (1925)                      | 21. Berry (1954)                         |
| 4. Stephens (1929)                     | 22. Bartsch (1917)                       |
| 5. Waterfall (1929)                    | 23. Howe (1922)                          |
| 6. Arnold (1903)                       | 24. Baily (1935)                         |
| 7. Carpenter <i>in</i> Cooper (1888)   | 25. Dall <i>in</i> Grant and Gale (1931) |
| 8. Cooper (1888)                       | 26. Oldroyd (1924)                       |
| 9. Chace and Chace (1919)              | 27. Howard (1935)                        |
| 10. Berry (1908)                       | 28. Jordan and Hertlein (1926)           |
| 11. Jordan (1926)                      | 29. Nomland (1917)                       |
| 12. Strong (1928)                      | 30. Keen (1954)                          |
| 13. Willett (1937)                     | 31. Woodring (1938)                      |
| 14. Woodring and Bramlette (1950)      | 32. Clark (1915)                         |
| 15. Clark (1931)                       | 33. Hertlein (1934)                      |
| 16. Merriam (1941)                     | 34. Emerson and Addicott (1953)          |
| 17. Dall (1892)                        | 35. Durham (1950)                        |
| 18. Bartsch (1911)                     | 36. Berry (1922)                         |
|  | 37. Chace (1917)                         |

TABLE 2.—Stratigraphic distribution of species

Species	Miocene	Pliocene	Pleistocene	Recent
PELECYPODA				
<i>Solemya valvulus</i>				x
<i>Nuculana hamata</i>		x 6	x 6, 26	x
<i>Glycymeris subobsoleta</i>			x 2, 6	x
<i>Huxleyia munita</i>			x 1	
<i>Philobrya setosa</i>			x 1, 2	x
<i>Ostrea lurida</i>		x 27	x 1, 3, 4, 5, 6, 11 Mexico, 13	x
<i>Pecten circularis</i>		x 2*	x 5, 6, 28	x
<i>aequisulcatus</i>			Mexico, 34	
<i>Modiolus fornicatus</i>		x 6, 29	x 6, 11 Mexico, 15, 34	x
<i>Asthenothaerus villosior</i>				x
<i>Pandora bilirata</i> (Conrad)			x 6	x
<i>P. filosa</i>	x 14cf.	x 14cf.	x 6, 15	x
<i>Cuspidaria pectinata</i>			x 6, 15	x
<i>Plectodon scabra</i>				x
<i>Astarte compacta</i>				x
<i>Eucrassatella fluctuata</i>			x 1	x
<i>Glans subquadrata</i>		x 14	x 1, 2, 6, 9, 11 Mexico, 13	x
<i>Miodontiscus prolongatus</i>		x 14cf.	x 1, 2, 3	x
<i>Axinopsida serricata</i>				x
<i>Lucina tenuisculpta</i>		x 2*, 14cf.	x see 2, 6, 3, 15	x
<i>Kellia lapeousii chironii</i>				x
<i>Mysella tumida</i>		x 14	x 2, 11 Mexico	x
<i>Pristes oblongus</i>				x
<i>Pseudopythina rugifera</i>				x
<i>Lepton meroeum</i>				x
<i>Nemocardium centifilosum</i>			x 15, 30	x
<i>Compsomax subdiaphana</i>	x 14cf. 31cf.	x 2*, 14cf.	x 1, 5, 6, 8, 13, 15	x
<i>Humularia kennerleyi</i> (Reeve)				x
<i>Protothaca lacinialta</i>			x 11 Mexico	x
<i>P. staminea</i>				x
<i>P. tenerrima</i>	x 14cf.	x 2*, 14cf.	x 2*, 11 Mexico, 13	x
<i>Psephidia salmonea</i>		x 6	x 6, 8	x
<i>Petricola tellinialis</i>			x 13	x
<i>Cooperella subdiaphana</i>			x 13	x
<i>Tellina modesta</i>			x 11 Mexico	
<i>T. buttoni</i> Dall [= <i>T. obtusa</i> (Carpenter)]			x See 2	x
<i>T. carpenteri</i> Dall [= <i>T. variegata</i> (Carpenter)]			x See 2	x
<i>T. salmonea</i>	x 32		x 3, 6	x
<i>Apolymetis biangulata</i>	x? 2*	x? 2*	x 2*, 13, 34	x
<i>Macoma expansa</i>				x
<i>M. yoldiformis</i>	x 2*	x 2*, 14cf.	x 33 Mexico, 11 Mexico, 13	x
<i>M. indentata</i>	x 2*, 14	x 2*, 14cf.	x 2*, 11 Mexico, 13	x
<i>Semele incongrua</i>			x 3, 15	x
<i>Gari regularis</i>				x
<i>Solen rosaceus</i>	x 2*	x 2*	x 2*, 11 Mexico	x
<i>Sphenia fragilis</i>				x
<i>S. ovoidea</i>				x

\*See for additional localities.

TABLE 2.—Stratigraphic distribution of species (Continued)

Species	Miocene	Pliocene	Pleistocene	Recent
<i>Corbula luteola</i>	x 2		x 2*, 11 Mexico, 13, 33 Mexico, 35 Lower Cali- fornia	x
SCAPHOPODA				
<i>Dentalium rectius</i>	? 23 Oregon	x 23 Oregon		x
GASTROPODA				
<i>Puncturella cooperi</i>			x 1	x
<i>Acmaea funiculata</i>			x 1	x
<i>A. limatula</i>			x 1, 2, 3, 4	x
<i>A. rosacea</i>			x 33 Mexico	x
<i>A. triangularis</i>				x
<i>Lepeta caecoides</i>				x
<i>Margarites lacunatus</i>				x
<i>M. tenuisculptus</i>				x
<i>M. acuticostatus</i>				x
<i>M. funiculatus</i>				x
<i>M. inflatulus</i>				x
<i>M. lirulatus</i>		x 5	x 2, 5	x
<i>M. lirulatus conicus</i>				x
<i>M. lirulatus obsoletus</i>				x
<i>M. lirulatus subelevatus</i>				x
<i>M. optabilis</i>			x 1, 15	x
<i>M. parcipictus</i>				x
<i>M. rhodia</i> Dall				x
<i>M. salmoneus</i>				x
<i>M. succinctus</i>			x 1	x
<i>Cidarina cidaris</i>		(x?) 2, 7	x 1, 2, 6	x
<i>Solarliella peramabilis</i>		x 5	x 6, 15	x
<i>Calliostoma gemmulatum</i>		x 6	x 2, 6, 13	x
<i>C. splendens</i>			x 2	x
<i>C. supragranosum</i>			x 1, 9, 13	x
<i>C. variegatum</i>				x
<i>Tegula funebris subaperta</i>			x 6	x
<i>Halistylus pupoideus</i>			x 1, 2, 13, 34	x
<i>Teinostoma supravallatum</i>			x 1	x
<i>Teinostoma invallatum</i>			x 1	x
<i>Liotia fenestrata</i>			x 1	x
<i>Arene acuticostata</i>			x 1	x
<i>Homalopoma baculum</i>	x 6, 10		x 1, 2, 6, 15	
<i>H. carpenteri</i> (Pilsbry)	x 10		x 1, 2, 6, 9, 11	
<i>Phasianella substriata</i>			x 11 Mexico, 13	x
<i>P. compta punctulata</i>				x
<i>P. pulloides</i>			x 1, 13, 11 Mexico, 15	x
<i>Lacuna porrecta</i>			x 2, 6?	x
<i>L. unifasciata</i>			x 2, 4, 5, 11 Mexico, 13, 14	
<i>L. unifasciata aurantiaca</i>			x 14	x
<i>L. variegata</i>			x 1?	x
<i>Amphithalamus inclusus</i>			x 1	x
"A". lacunatus			x 1	x
<i>Alvania acutelirata</i>		x 5, 10	x 1, 5, 6	
<i>A. carpenteri</i> Weinkauff ( <i>A. reticulata</i> )				x

TABLE 2.—Stratigraphic distribution of species (Continued)

Species	Miocene	Pliocene	Pleistocene	Recent
<i>A. compacta</i>				x
<i>A. filosa</i>				x
<i>Barleeia haliotiphila</i>			x 1, 15	x
<i>B. marmorea</i>		x 10	x 1, 15	x
<i>B. subtenuis</i>				x
<i>Diala acuta</i>			x 14	x
<i>Assimineia translucens</i>			x 1, 11 Mexico, 14	x
<i>Turritella cooperi</i>	x 16	x 1, 2*, 16	x 1, 2, 15, 16	x
<i>Tachyrhynchus lacteolum</i>				x
<i>T. lacteolum subplanatum</i>			x 11 Mexico	x
<i>Petalocoynchus compactus</i>				x
<i>Aletes squamigerus</i>			x 2, 4, 6, 8, 11 Mexico, 13, 33 Mexico, 34	x
<i>Caecum californicum</i> Dall			x 1, 3, 6, 11 Mexico	x
<i>Micranellum crebricinctum</i>			x 1, 3, 6, 11	x
<i>Cerithiidea hegewischii albonodosa</i>		x 35 Lower Cali- fornia	Mexico, 13, 17	
<i>Bittium armillatum</i>			Type	x
<i>B. attenuatum</i>			x 1, 2, 3, 18	x
<i>B. purpureum</i>				x
<i>B. quadrifilatum</i>				x
<i>B. rugatum</i>			x Type 11 Mexico, 13, 15	x
<i>B. interfossa</i>			x 1, 11 Mexico	x
<i>B. munitum</i>				x
<i>Alabina tenuisculpta</i>			x 1	x
<i>A. turrata</i>				x
<i>Cerithiopsis columna</i>				x
<i>Diastoma fastigiatum</i>				x
<i>Epitonium indianorum</i>	x 19	x 5, 19	x 5, 6, 13, 14, 15, 34	x
<i>E. tinctum</i>		x 8	x 6, 11 Mexico, 13, 14, 19	x
<i>E. bellistriatum</i>			x 3, 6, 8, 13	x
<i>E. subcoronatum</i>				x
<i>Opalia insculpta</i>			Type	x
<i>O. bullata</i> [ <i>O. spongiosa</i> and <i>O. reliporosa</i> ]		x 20		x
<i>Balcis compacta</i>			x 21	x
<i>B. micans</i>			x 6, 8, 11 Mexico, 13, 21	x
<i>B. rutila</i>			x 11 Mexico, 13, 21, 22	x
<i>B. thersites</i>			x 3, 11 Mexico, 21	x
<i>Cythnia albida</i>				x
<i>Iselica fenestrata</i>			x 1, 3, 6, 13	x
<i>I. obtusa</i>				x
<i>Hipponix tumens</i>			x 1, 2, 3, 6, 9, 11 Mexico, 13, 33	x
<i>H. antiquatus</i> [cranioides]			x 1, 3, 6, 13	x

\*See for additional localities.



TABLE 2.—Stratigraphic distribution of species (Continued)

Species	Miocene	Pliocene	Pleistocene	Recent
<i>Calyptrea contorta</i>			x 13	x
<i>Velutina prolongata</i>				x
<i>Ocenebra interfossa</i>	x 23	x 10, 23	x 1, 3, 6, 11 Mexico, 13, 34	x
<i>O. interfossa atropurpurea</i>				x
<i>O. poulsoni</i>			x 5, 6, 11 Mexico, 13, 33	
<i>O. squamulifera</i>			x Cpr., 1, 6, 13	x
<i>O. tenuisculptus</i>		x 24	x Cpr., 1, 6	x
<i>Trophonopsis triangulatus</i>			x 6, 8	x
<i>Mitrella gouldi</i>		x 2, 20	x 3, 13	x
<i>M. tuberosa</i>	x 2	x 2, 6, 10	x 2, 3, 6, 11 Mexico, 15	x
<i>Amphissa undata</i>			x 1	x
<i>Anachis penicillata</i>			x 1, 2, 3	x
<i>A. subtrrita</i>				x
<i>Aesopus chrysalloideus</i>			x 1	x
<i>A. eurytoideus</i>				x
<i>Nassaricus insculptus</i>		x 2	x 6, 13	x
<i>Calicantharus fortis</i>			Type x 1, 13, 15	
<i>Exilioidea rectirostris</i>			x 1, 6, 13, 15	x
<i>Gibberulina pyriformis</i>			x 1, 3, 11 Mexico, 13, 15	x
<i>Cystiscus jewettii</i>			x 1, 3, 6, 9, 11 Mexico	x
<i>C. regularis</i>			x 3, 11 Mexico	x
<i>C. subtrigona</i>			x 3	x
<i>Admete gracilior</i>			x 3, 15	x
<i>A. modesta</i>			Type	
<i>Terebra "philippiana" Dall</i>			x 1, 2, 4, 5, 6, 11 Mexico	x
[ <i>T. simplex</i> Cpr.]				
<i>Ophiodermella incisa</i>			x 2	x
<i>Cytharella fusconotata</i>				x
<i>Mangelia barbarendis</i> (Oldroyd)			x 3, 6, 11 Mexico, 13	x
<i>M. crebricostata</i>			x 3	x
<i>M. interfossa</i>				x
" <i>M.</i> " <i>levidensis</i>				x
<i>M. nitens</i>				x
<i>M. variegata</i>			x 6, 13	
<i>Pseudomelatoma moesta</i>			x 11 Mexico, 15	x
<i>P. torosa</i>				x
<i>P. torosa aurantia</i>				x
<i>Granotoma excurvata</i>				x
<i>Propebela tabulata</i>			x 15	
<i>Mitromorpha aspera</i>			x 11 Mexico	
<i>M. filosa</i>			x 3, 6, 11 Mexico	x
<i>Acteon punctocaelatus</i>			x 3, 6, 11 Mexico, 13	x
<i>Atys casta</i>			x 13	
<i>Vohulella cylindrica</i>			x 2, 3, 6, 13	x
<i>Coleophysys carinata</i>			x 3, 11 Mexico, 13	x
<i>Cylichna attonsa</i>			x 2 Oregon, 13	x
<i>Odostomia callimorpha</i>				x
Dall and Bartsch				
[ <i>pumila</i> Cpr.]				

TABLE 2.—Stratigraphic distribution of species (Continued)

Species	Miocene	Pliocene	Pleistocene	Recent
<i>O. cincla</i>				x
<i>O. inflata</i>				x
<i>O. jewetti</i> Dall and Bartsch				x
<i>O. tenuisculpta</i>				x
<i>O. avellana</i>			x 2, 3	x
<i>O. gouldii</i>				x
<i>O. nuciformis</i>				x
<i>O. satura</i>			x 6 (D&B)	x
<i>Turbonilla laminata</i>			x 3, 6, 11 Mexico, 13	x
<i>T. virgo</i>				x
<i>T. aurantia</i>			x 6	x
<i>T. chocolata</i>			x 8	x
<i>T. tridentata</i>			x 2, 6, 13	x
<i>T. stylina</i>			x 3, 6, 8, 11 Mexico, 13	x
<i>Siphonaria thersites</i>				x
<i>Williamia peltoides</i>			x 1, 2, 13	x
<i>Melampus olivaceus</i>	x 25		x 1, 6, 11 Mexico, 13	x
AMPHINEURA				
<i>Leptochiton internexus</i> Carpenter in Pilsbry				x
<i>L. nexus</i>			x 13	x
<i>L. rugatus</i> (Pilsbry)				x
<i>Cyanoplax hartwegii</i> and <i>nuttalli</i>			x 9, 36	x
<i>C. dentiens</i> (Gould) = [ <i>C.</i> <i>pseudodentiens</i> (Carpenter)]			x 36	x
<i>Nuttalina fluxa</i>				x
<i>Chaetopleura beanii</i>			x 9, 36	x
<i>C. gemma</i> "Dall", Pilsbry			x 36	x
<i>C. parallela</i>				x
<i>C. prasinata</i>				x
<i>Ischnochiton newcombi</i> Carpenter in Pilsbry			x 36	x
<i>I. scabricostatus</i>				x
<i>I. veredentiens</i>				x
<i>I. acrior</i> (Pilsbry)			x 36	x
<i>I. conspicuus</i> "Dall", Pilsbry		? 36	x 9, 36, 37	x
<i>I. corrugatus</i> Carpenter in Pilsbry				x
<i>I. fallax</i> Carpenter in Pilsbry			x 36	x
<i>I. aureotinctus</i> Carpenter in Pilsbry				x
<i>I. cooperi</i> "Dall" Pilsbry			x 9, 36	x
<i>I. radians</i> Carpenter in Pilsbry				x
<i>I. retiporosus</i>				x
<i>I. serratus</i>				x
<i>I. sinudentatus</i> Carpenter in Pilsbry			x 36cf.	x
<i>I. regularis</i>			x 6, 36	x
<i>I. trifidus</i>				x
<i>Callistochiton decoratus</i> Pilsbry				x
<i>C. palmulatus</i> Carpenter in Pilsbry			x 36	x
<i>Mopalia acuta</i>			x 13, 36	x
<i>M. imporcata</i>				x
<i>M. lignosa</i> (Gould) = <i>M.</i> <i>montereyensis</i> (Carpenter)			x 9, 36	x

\*See for additional localities.

TABLE 2.—*Stratigraphic distribution of species (Concluded)*

Species	Miocene	Pliocene	Pleistocene	Recent
<i>M. muscosa kennerleyi</i>				x
<i>M. sinuata</i>			x 36cf.	x
<i>M. swanii</i>				x
<i>Dendrochiton gothicus</i>				x
<i>Basiliochiton flectens</i>				x
<i>Acanthochitona avicula</i>			x 36	x

GENERIC NAMES DESCRIBED BY CARPENTER

The following is a list of molluscan generic names of which Carpenter is the author. Because of the nonuniformity of authorship of manuscript chiton names which Dall or Pilsbry validated after Carpenter's death (1877) such names are included. Equivalent, preoccupied, and manuscript names of Carpenter are in roman. The author who validated them is given. For complete reference of authors not included in the bibliography, see Neave (1939-1940).

- Aletes* Carpenter, 1857a, p. 301 (Vermetidae); not *Aletes* Rafinesque, 1815 *nomen nudum*; not of Chapuis, 1874, or of Lohmann, 1899
- Amiantis* Carpenter, 1864b, p. 536, 540, 553, 620, 640, 665; Reprint, 1872, p. 22, 26, 39, 126, 151 (Veneridae)
- Ampithalamus* Carpenter 1864b, p. 614, 656; Reprint, 1872, p. 100, 142 (Rissoidae)
- Angasia* Carpenter ms. = Dall, 1882, p. 283; = *Phacellozonia* Pilsbry, 1894a, p. 139 = *Craspedochiton* Shuttleworth, 1853 (Cryptoplacidae); not *Angasia* Bates, 1864
- Anellum* Carpenter, 1857a, p. 319 as section; 1859, p. 423 [as section] (Caecidae)
- Arthuria* Carpenter ms. = Dall, 1882, p. 284 (*fide* Pilsbry, 1892, p. 256) = ? *Pallochiton* Dall, 1882, p. 283 (Ischnochitonidae); not of Servain, 1891
- Asthenothaerus* Carpenter, 1864a, p. 311; Reprint, 1872, p. 209 (Thraciidae); see this report
- Beania* Carpenter ms.; Dall, 1882, p. 287 = *Beanella* Dall, 1882, p. 284 = *Middendorfia* Carpenter ms. = Dall, 1882, p. 287 (Lepidochitonidae); not *Beania* Johnston, 1840
- Bryophila* Carpenter, 1864a, p. 314; Reprint, 1872, p. 212 = *Philobrya* Cooper, 1867, p. 12 (Limopsidae); not *Bryophila* Treitscke, 1825; see this report
- Callistochiton* Carpenter ms. = Dall, 1879, p. 297 (Ischnochitonidae); see this report
- Callistoplax* Carpenter ms. = Dall, 1879, p. 297; Dall, 1882, p. 283 (Ischnochitonidae)
- Ceratophorus* Carpenter ms. = Dall, 1879, p. 297, Dall, 1882, p. 286 = *Ceratozonia* Dall, 1882, p. 283 (Mopaliidae); not *Ceratophorus* Shuckard, 1837; Gistl, 1848; Diesing, 1848
- Chonechiton* Carpenter ms. in Dall, 1882, p. 280; Lower Carboniferous, Dinantian, Visé, Belgium
- Chitoniscus* Carpenter ms., Dall, 1879, p. 299; not of Herrmannsen, 1846, or Stål, 1875, or Waterhouse, 1876
- Choneplax* Carpenter ms. = Dall, 1879, p. 299; Dall, 1882, p. 285 (Cryptoplacidae)
- Choristes* Carpenter in Dawson, 1872, p. 392; monotype *C. elegans* Carpenter in Dawson, 1872 (Choristidae)
- Chrysallida* Carpenter, 1856c, p. 170 (Pyramidellidae); see this report
- Clathurella* Carpenter, 1857a, p. 399 (Turridae); see this report
- Clidiophora* Carpenter, 1864b, p. 613, 627, 638; Reprint, 1872, p. 99, 113, 124; 1864c, p. 596; Reprint, 1872, p. 225. Carpenter's first mention of this generic name was in connection with *C. punctata* [Conrad], pages 613 and 627, which would make the species a monotype if page preference is the basis of type species determination. On page 638, 1864b and page 596, 1864c, Carpenter stipulated *Pandora claviculata* Carpenter, 1855, as type species. (Pandoridae)
- Coelodon* Carpenter, 1864c, p. 599 = *Frenamyia* Iredale, 1930 (Pandoridae); not *Coelodon* Lund, 1838
- Cooperella* Carpenter, 1864b, p. 611, 639 (Petricolidae); see this report; not *Cooperella* Gunnell, 1933 = *Deirolepis* Wells, 1944
- Cycladella* Carpenter, 1865b, p. 270 (Montacutidae)
- Cymatodus* Carpenter ms., Dall, 1882, p. 286 = *Lepidopleurus* Risso, 1820; not *Cymatodus* Newberry and Worthen, 1870; not of Trautschold, 1879
- Cythinia* Carpenter, 1864a, p. 478 (Melanellidae ? or Stiliferidae ?); see this report

- Dawsonia Carpenter ms. = *Middendorfia* Dall, 1882, p. 287 (Lepidochitonidae); not *Dawsonia* Hartt, 1868; Nicholson, 1873; Fritsch, 1879
- Deshayesiella Carpenter ms. = Dall, 1879, p. 314 (Lepidopleuridae)
- Dinoplax Carpenter ms. = Dall, 1882, p. 284 (Ischnochitonidae)
- Dunkeria* Carpenter, 1857a, p. 433 (Pyramidellidae)
- Elephantulum* Carpenter, 1857a, p. 314 [as section]; 1859, p. 419 [as section] (Caecidae)
- Eucosmia Carpenter, 1864a, p. 475; Reprint, 1872, p. 214 = *Eulithidium* Pilsbry, 1898, p. 60; not *Eucosmia* Stephens, 1829 (Turbinidae)
- Fartulum* Carpenter, 1857a, p. 325 [as section]; 1859, p. 431 [as section] (Caecidae)
- Francisia Carpenter ms. = Dall, 1882, p. 284 = *Acanthopleura* Guilding, 1829 (Chitonidae); not *Francisia* Paladilhe, 1872
- Glandinaria Nuttall ms., Carpenter 1857a, p. 467 = *Olivella*
- Glyphis Carpenter, 1857a, p. 220 = *Diodora* Gray, 1821 (Fissurellidae); not of Agassiz, 1843
- Guidingia Carpenter ms. = Pilsbry, 1893, p. 312, 329 = *Plaxiphora* Gray, 1847 (Mopaliidae)
- Haplocochlias* Carpenter, 1864a, p. 476; 1864b, p. 618 (Trochidae)
- Hemphillia Carpenter ms. = Dall, 1882, p. 287 = *Pallochiton* Dall, 1882, p. 287; see this report (Ischnochitonidae); not *Hemphillia* Bland and Binney, 1872
- Hemiarthrum* Carpenter in Dall, 1876, p. 44 (Lepidopleuridae)
- Heterozona Carpenter ms. = Dall, 1879, p. 331 (Ischnochitonidae)
- Homalopoma Carpenter, 1864b, p. 587, 588, 627 (Leptonyx Carpenter, 1864b, p. 612, 627, 652 (Turbinidae); see this report
- Inflatulum Carpenter, 1857a, p. 314 [as section]; 1859, p. 438 [not genus] in part *Meioceras* Carpenter, 1859, p. 438
- Ischnoplax Carpenter ms. = Dall, 1879, p. 330 (Ischnochitonidae)
- Ischnoradsia Carpenter ms. = Dall, 1879, p. 331; not of Shuttleworth, 1853
- Kennerlia* Carpenter, 1864b, p. 602 (Pandoridae); see this report
- Lecania Carpenter, 1866c p. 343 = *Lottia* (Gray) Sowerby, 1833 (Acmaeidae)
- Lepidoradsia Carpenter ms. = Dall, 1879, p. 331 = *Ischnoradsia* Shuttleworth, 1853 (Ischnochitonidae)
- Leiosolenus* Carpenter, 1857a, p. 130
- Leptonyx Carpenter, 1864b, p. 612, 627, 652 = *Homalopoma* Carpenter, 1864b, p. 507, 588, 627; not *Leptonyx* Swainson, 1833 or 1837; Gray, 1837; Lesson, 1842; Hitchcock, 1865; see this report
- Leptoplax Carpenter ms. = Dall, 1882, p. 283 = *Notoplax* H. Adams, 1861 (Cryptoplacidae)
- Lepidopleurus Carpenter ms., Dall, 1879, p. 332; not of Risso, 1826, or Claparède, 1868, or Duncan and Sladen, 1885
- "*Lutricola* Cpr." in Salisbury, 1934, p. 76 is a *nomen nudum*. The "*L. alba*" Carpenter, 1864b, p. 639, No. 58 is typographical error for *L. alta* Conrad.
- Loricites* Carpenter ms. in Dall, 1882, p. 281; Lower Carboniferous Dinantian, Visé, Belgium
- Macrandrellus Carpenter ms. = Dall, 1882, p. 284 = *Notoplax* H. Adams, 1861 (Cryptoplacidae)
- Macrophragma* Carpenter, 1857a, p. 308 (Vermetidae)
- Maugerella Dall (Carpenter ms.), 1879c, p. 296 = *Stenoplax* Dall, 1879; see *Ischnochiton conspicuus*
- Meioceras* Carpenter, 1859, p. 438 (Caecidae)
- Middendorfia* Carpenter ms., Dall, 1882, p. 287; see *Dawsonia*
- Miodon Carpenter, 1864b, p. 611, 627, 642, 682 = *Miodontiscus* Dall, 1903, p. 14; not *Miodon* Dumeril, 1859 (Carditidae); see this report
- Mitromorpha* Adams in Carpenter, 1865 (Turridae); see this report
- Netastoma Carpenter, 1864a, p. 529, 540, 605, 635, 637, 684; Reprint, 1872, p. 15, 26, 91, 121, 123, 170; not *Netastoma* Rafinesque, 1810 (Pholadidae)
- Netastomella* Carpenter, 1865a, p. 202; Reprint, 1872, p. 250 = *Netastoma* Carpenter, 1864 (Pholadidae); not *Netastomella* Facciola, 1914
- Newcombia Carpenter ms. in Pilsbry, 1892, p. 290 = *Ceratozona* Dall, 1879, p. 297; 1882, p. 283 (Mopaliidae); not *Newcombia* Pfeiffer, 1854
- Nuttallina Carpenter ms. = Dall, 1871, p. 134 (Lepidochitonidae); see this report
- Oedalia Carpenter, 1864b, p. 611 = *Cooperella*, 1864b, p. 611; not *Oedalia* Meigen, 1820 (Petricolidae); see this report
- Oedalina Carpenter, 1865b, p. 208 = *Cooperella* Carpenter, 1864 (Petricolidae); see this report
- Placiphora Carpenter, ms., Dall, 1879, p. 298; error for *Plaxiphora* Gray, 1847 (Mopaliidae)
- Placiphorella Carpenter ms. = Dall, 1879, p. 298, 303, 306 (Mopaliidae); see this report
- Plectodon* Carpenter, 1864b, p. 638 (Cuspidariidae); not *Plectodon* Giglioli, 1873; see this report
- Pleurotemaria Carpenter, 1861, p. 218 corrected in separate misspelling of *Pleurotomaria* J. Sowerby, 1821; see Cox, 1955, p. 24

- Polyspirella* Carpenter in Gould, 1861a, p. 407 = *Cingulina* A. Adams, 1860 in part *vide* Dall and Bartsch, 1909 (Pyramidellidae)  
*Pristiphora* Carpenter, 1866, p. 210 = *Serridens* Dall, 1899; not *Pristiphora* Latreille, 1810 (Erycinidae); see this report  
*Pristes* Carpenter, 1864b, p. 611, 643 = *Pristiphora* Carpenter, 1866, p. 210; not *Pristis* Linck, 1790, not Brullé, 1846, nor Redtenbacher, 1895 (Erycinidae)  
*Probolacum* Carpenter ms. in Dall, 1882, p. 281, 283; Devonian of Vilmar (Dall)  
*Psephis* Carpenter, 1864, p. 640 = *Psephidia* Dall, 1902, p. 243; not *Psephis* Guenée, 1854 nor Felder and Rogenhofer, 1875 (Erycinidae); see this report  
*Pterochiton* Carpenter ms. in Dall, 1882, p. 281, 283; Lower Carboniferous, Dinantian, Visé, Belgium  
*Sclerochiton* Carpenter ms. = Dall, 1882, p. 284, no type = Pilsbry, 1892, p. 188 = *Squamopleura* Nierstrasz, 1905; not *Sclerochiton* Kraatz, 1859  
*Spongiochiton* Carpenter ms. = Dall, 1882, p. 283 = *Notoplax* H. Adams, 1862 (Cryptoplacidae)  
*Stenoplax* Carpenter ms. = Dall, 1879c, p. 296 (Ischnochitonidae); see this report  
*Stenoplax* Carpenter ms. = Dall, 1882, p. 284  
*Stenoradsia* Carpenter ms. = Dall, 1879, p. 296 = *Stenoplax* Dall, 1879 (Ischnochitonidae)  
*Stereochiton* Carpenter ms. = Dall, 1882, p. 286 = *Trachyradsia* Carpenter ms. = Dall, 1879 (Lepidochitonidae)  
*Stimpsoniella* Carpenter, 1873, p. 155 = *Amicula* Gray, 1847 (Mopalliidae)  
*Strebloceras* Carpenter, 1859, p. 440 (Caecidae)  
*Streplochiton* Carpenter ms. = Dall, 1882 = *Frembleya* H. Adams, 1867 (Mopalliidae)  
*Tecturella* Carpenter, 1860, p. 3 = *Lottia* (Gray), Sowerby, 1833 (Acmaeidae); see *Lecania* Carpenter, 1866, p. 343  
*Tecturina* Carpenter, 1860d, p. 219; 1861, p. 71 [separate]  
*Tonicella* Carpenter, 1873, p. 154 (Leptochitonidae)  
*Trachydermon* Carpenter, 1864, *Basilochiton* Berry, 1918; see this report (Mopalliidae)  
*Trachyradsia* Carpenter ms. = Dall, 1879a, p. 1  
*Tuberia* Carpenter, 1857a, p. 365  
*Vitrinula* Gray in Carpenter, 1857, p. 237 = *Vitrinella* Gray, 1855, p. 65, not C. B. Adams, 1850 = *Otesia* H. and A. Adams, 1858, p. 642 (Limacidae); see Pilsbry, 1945, p. 67

## TYPE SPECIES DESCRIBED BY CARPENTER

The following list may not be complete.

Type Species	Genus or Subgenus	Family
<i>A. inclusus</i>	<i>Amphithalamus</i> Carpenter, 1864	Rissoidae
<i>Scalaria bellistriata</i>	<i>Asperiscala</i> de Boury, 1909	Epitoniidae
<i>A. villosior</i>	<i>Asthenothaerus</i> Carpenter, 1864	Thraciidae
<i>D. paucilirata</i>	<i>Dunkeria</i> Carpenter, 1857 (= <i>Pyrisculus</i> Monterosato, 1884)	Pyramidellidae
<i>Dunkeria subangulata</i>	<i>Bartschella</i> Iredale, 1916 (= <i>Dunkeria</i> Dall and Bartsch, 1909)	Pyramidellidae
<i>Chrysallida convexa</i>	<i>Besla</i> Dall and Bartsch, 1904	Pyramidellidae
<i>B. setosa</i>	<i>Bryophila</i> Carpenter, 1864 = <i>Philobrya</i> Carpenter, 1864	Limopsidae
<i>Tapes tenerrima</i>	<i>Callithaca</i> Dall, 1902	Veneridae
<i>C. elegans</i>	<i>Choristes</i> Carpenter in Dawson, 1872	Choristidae
<i>C. cidaris</i> (A. Adams in Carpenter)	<i>Cidarina</i> Dall, 1909	Trochidae
<i>C. claviculata</i>	<i>Clidiophora</i> Carpenter, 1864	Pandoridae
<i>Saxidomus gibbosus</i> Gabb = <i>Compsomyx subdiaphana</i> (Carpenter)	<i>Compsomyx</i> Stewart, 1930	Veneridae

<i>Cooperella subdiaphana</i>	<i>Cooperella</i> Carpenter, 1864 (not <i>Cooperella</i> Gunnell, 1933)	Petricolidae
<i>Chiton hartwegii</i>	<i>Cyanoplax</i> Pilsbry, 1892 (= <i>Mopaliopsis</i> Thiele, 1893)	Lepidochitonidae
<i>Volutella pyriformis</i>	<i>Cypraeolina</i> Cerulli-Irelli, 1911 = <i>Merovia</i> Dall, 1921 = <i>Gibberu-</i> <i>lina</i> Monterosato, 1884	Marginellidae
<i>C. asteriaphila</i>	<i>Cythnia</i> Carpenter, 1864	Melanellidae
<i>Caccum heptagonum</i> [ <i>Hexagonum</i> sic correction, Bartsch, 1947, p. 104]	<i>Elephantanellum</i> Bartsch, 1921	Caecidae
<i>Parthenia lacunata</i>	<i>Egila</i> Dall and Bartsch, 1904	Pyramidellidae
<i>E. variegata</i> Carpenter <i>typica</i> Dall	<i>Eucosmia</i> Carpenter, 1864 = <i>Eulithidium</i> Pilsbry, 1898	Turbinidae
<i>Chrysallida photis</i>	<i>Haldra</i> Dall and Bartsch, 1904	Pyramidellidae
<i>H. cyclophoreus</i>	<i>Haplocochlias</i> Carpenter, 1864	Trochidae
<i>H. setulosum</i> Carpenter <i>in</i> Dall	<i>Hemiarthrum</i> Carpenter <i>in</i> Dall, 1876	Lepidopleuridae
<i>Lucina richthofeni</i> Gabb = <i>L. excavata</i> Carpenter, 1857	<i>Here</i> Gabb, 1866	Lucinidae
<i>Parthenia armata</i>	<i>Ividia</i> Dall and Bartsch, 1904 = <i>Miralda</i> A. Adams, 1864	Pyramidellidae
<i>K. filosa</i>	<i>Kennerlia</i> Carpenter, 1864	Pandoridae
<i>Drillia eburnea</i>	<i>Laevitectum</i> Dall, 1919	Turridae
<i>Siphonaria thersites</i>	<i>Liriola</i> Dall, 1871	Siphonariidae
<i>Margarites lirulatus</i>	<i>Lirularia</i> Dall, 1909	Trochidae
?? <i>Chrysallida clausiliformis</i>	<i>Lysacme</i> Dall and Bartsch, 1904	Pyramidellidae
<i>M. nitidum</i> Bean ms. Carpenter = <i>M. nitidum</i> (Stimpson)	<i>Meioceras</i> Carpenter, 1859	Caecidae
<i>Caccum crebricinctum</i>	<i>Merovia</i> Dall. See <i>Cypraeolina</i> <i>Micranellum</i> Bartsch, 1920	Caecidae
<i>M. filosa</i>	<i>Mitromorpha</i> Adams <i>in</i> Carpenter, 1865	Turridae
<i>M. prolongata</i>	<i>Miodon</i> Carpenter, 1864 = <i>Miodontiscus</i> Dall, 1903	Carditidae
<i>Petalococonchus macrophragma</i>	<i>Macrophragma</i> Carpenter, 1857	Vermetidae
<i>Lucina tenuisculpta</i>	<i>Parvilucina</i> Dall, 1901	Lucinidae
<i>P. setosa</i>	<i>Philobrya</i> Cooper, 1867 (= <i>Bryophila</i> Carpenter, 1864)	Limopsidae
<i>P. oblonga</i>	<i>Pristiphora</i> Carpenter, 1866 = <i>Serridens</i> , Dall, 1899	Erycinidae
<i>Drillia penicillata</i>	<i>Pseudomelatoma</i> Dall, 1918	Turridae
<i>Dentalium rectius</i>	<i>Rhabdus</i> Pilsbry and Sharp, 1897	Dentaliidae
<i>Acteon punctocaelatus</i>	<i>Rictaxis</i> Dall, 1871	Acteonidae
<i>Chiton regularis</i>	<i>Rhombochiton</i> Berry, 1919	Ischnochitonidae
<i>Pristiphora oblonga</i>	<i>Serridens</i> Dall, 1899	Erycinidae
<i>Trachydermon trifidus</i>	<i>Tripoplax</i> Berry, 1919	Ischnochitonidae

## SYSTEMATIC DESCRIPTIONS

### EXPLANATORY REMARKS

Mrs. Ida Oldroyd's four-part manual (1924-1927) *Marine Shells of the West Coast of North America* has furnished and will continue to be a comprehensive universal reference for West Coast workers. Original descriptions of the majority of Carpenter's species are included in that text, and such quotations are not repeated in this report. On comparing the quoted descriptions in Oldroyd with the originals one finds that the last remarks including the localities of the original descriptions are omitted in nearly every case. Since the original locality and final remarks are in many cases the crux in deciding debatable questions that portion of the remarks must be included in original data. Attention is called to such omissions and quotation of the same herein. Opinion 52, International Rules of Zoological Nomenclature stipulates:

"The citation of the type locality of a species is not sufficient to establish a name under Article 25a of the Code. If specific characters are given in addition to the type locality, the type locality becomes a part of the description and is to be considered as an important element in determining the identity of species."

To anyone who has followed Mrs. Oldroyd's text and that of Dall (1921) it becomes apparent that she followed Dall in details of reference, authors, and remarks. Where typographical errors, omissions, and errors of fact are in Dall, they are repeated in Oldroyd. In a large number of the copies in Oldroyd of the Carpenter original descriptions, typographical mistakes are numerous. Such corrections are inserted in the text of the discussions of the species in this paper. This has not been done in a spirit of criticism but only so that time and labor may be saved for others who do not have access to the original articles of Carpenter. Even the 1872 Reprint by the Smithsonian Institution of many of Carpenter's papers is out of print and unobtainable by most people.

Measurements in Carpenter's text are referred to as poll. (pollex = thumb) or without such designation. In the Preface to the Mazatlan Catalogue, the explanation states that, "all measurements of length are given in inches and decimal portions." Where "poll." is not inserted in his data, the writer assumed the measurements to be in inches and used 25.4 mm. to an inch to convert the measurements into modern usage. In the article on the new species from California (1865g, p. 133, footnote) Carpenter defined pollex as 2.53 cm. Hertlein and Strong noted (1946, p. 76) that Dr. Teng-Chien Yen investigated the length of pollex while at the British Museum and stated the measurement to be approximately 2 cm. Since the writer used Carpenter's measurements it would seem that one would arrive nearer his results by using his definition of pollex. The differences are slight between the three figures for the type of measurements involved.

In the Mazatlan Catalogue, Carpenter (1857, p. III) defined measurements for the bivalves as: "*long.* from the umbo to the *middle* of the ventral margin; *lat.* from the anterior to the posterior ends; *alt.* the thickness of the closed valves." But in his later papers (1864a, p. 311, footnote) he changed this defini-

tion in regard to "long": "The measures of length [long.] are taken from the anterior to the posterior margins." Unless one notes the difference of definition in these two specifications it is confusing when trying to reconcile the two systems of measurements used by Carpenter.

There appears to be a difference of opinion concerning the procedure to be used when renaming a preoccupied scientific name as to the type of the new name. Dall, and he has been followed by some modern workers, when applying a new name under the above circumstances frequently chose a new type for the species. If the new name is definitely supplied for an old one, as such, it would seem more logical and less confusing to the interpretation of the species if the type of the original name is retained. In this view the writer agrees with Strong (1928b, p. 197, footnote) that the type of *Eucosmia variegata* Carpenter when renamed by Dall remained the type established by Carpenter and not a new one designated by Dall. Strong, however, reversed his method when substituting with Hertlein (Strong and Hertlein, 1945, p. 105) a new name for the preoccupied *Lucina undata* Carpenter (not of Lamarck, 1819). Those authors chose a new shell from modern collections as the type of the new name. In this case there might be an exception because the original locality was not definite. However, the writer believes that the first endeavor would be to try to locate the original specimen in the Cuming Collection upon which the diagnosis of Carpenter's species was said to have been written (Carpenter, 1865d, p. 279; 1872, p. 272). In this matter of retaining the original type for the new name, the writer concurs with Dr. Fritz Haas (Personal communication, March 2, 1945).

If new types are selected (see case of *Tellina buttoni* Dall) possibly the subsequent author might not have the same species. In that case the new name would represent a new species, and the preoccupied name would still be unnamed. If the type of the preoccupied name is still in existence, it would seem better to retain the original type. If the original type were lost the same procedure would be followed as in the case of choosing any neotype—*i.e.*, designating a topotypic shell if possible (see also the case of *Tellina buttoni* Dall). Therefore, in this paper, where the original type of a renamed species is in existence the original is retained as the type and any later type designation disregarded.

The designation and use of neotypes have been customary in molluscan studies. During the course of study of this monograph the term was provisionally used in a few cases. Neotypes should be designated in those cases where it is known now that the original types have been lost. However, because of the conditions provided in the Rules of Zoological Nomenclature, 1953, it is not feasible to propose neotypes in this paper which is ready for the press. According to the decisions (Copenhagen, 1953, p. 30, 31) the designation of a neotype must be published in the Bulletin of Zoological Nomenclature, and its status is not legalized until it remains unchallenged for a period of "5" years. Consequently, neotypes should be designated and publicized during the preparation of a paper and not in a finished report. Suggestions have been made herein as to specimens which would qualify as neotypes.

The following institutions have been contacted, and examinations of the speci-



mens have been made by the writer or inquiries have been answered by persons in authority. Where the notation in regard to the depository of type in the text of this report is given as "Not found," such a statement means that it is not known in any of these institutions. These organizations are those which were possible sources of Carpenter material.

Academy of Natural Sciences at Philadelphia  
 American Museum of Natural History  
 Boston Society of Natural History  
 British Museum (Natural History)  
 California Academy of Sciences  
 Chicago Academy of Sciences  
 Chicago Museum of Natural History  
 Cornell University  
 Museum of Comparative Zoölogy  
 New York State Museum  
 Redpath Museum, McGill University  
 Stanford University  
 United States National Museum  
 University of California  
 Warrington Free Museum (Municipal Museum)

To reduce the printing of oft repeated references the following are written in the synonymy of species with author, date, page, and, if any, plate, only. The complete reference for each author is given in the bibliography.

Abbott, 1954  
 Arnold, 1903  
 Burch, 1942–1951. Referred by No.  
 Carpenter, 1864b  
 Carpenter, Reprint, 1872  
 Dall, 1921  
 Grant and Gale, 1931  
 Keen, 1937  
 Oldroyd, 1924b; 1927

Unless for some special reason the types which have been figured previously are not reillustrated herein. This would apply mainly to the pyramidellid, melanellid, turrid, and species of *Bittium* figured by Dall and/or Bartsch.

The locality of the type is given in the text and rarely repeated in the explanation of the plates; the measurements of the types are included in the figure explanatory data and infrequently duplicated in the text.

Carpenter used a form of shorthand (Rich, 1764) in his labels and notes which was utilized by English Presbyterian ministers (1860–1870 ca.). The chiton manuscript which remained unfinished at Carpenter's death was replete with the shorthand notations, much to Dall's regret. Fortunately, R. D. Darbishire in England deciphered the script, which allowed a better understanding of the thesis by Dall and Pilsbry than would otherwise have been possible.

Carpenter's own collection and notes which he made are in many cases accompanied by his monogram. In the case of the mounted specimens, the monogram is placed in the upper right-hand corner. A copy of the form is inserted on the frontispiece of this paper.

Under the distribution of species, the age of the distribution is understood to be Recent if it is not specified. Reference at end of paragraph is inserted for a pertinent illustration of that species.

Phylum MOLLUSCA  
Class PELECYPODA

Family SOLEMYIDAE (Solemyacidae)

Genus *Solemya* Lamarck, 1818

*Solemya* LAMARCK, 1818, Hist. Nat. An. s. Vert., vol. V, p. 488

Type species by subsequent designation, CHILDREN, 1823, LAMARCK'S Gen. Shells, vol. 14, p. 300; Reprint, KENNARD, SALISBURY AND WOODWARD, 1931, Smith. Misc. Coll., vol. 82, no. 17, p. 7, *Solenomya* [*Solemya*] *mediterranea* (LAMARCK), 1818, Hist. Nat. An. s. Vert., p. 489 = *Tellina togata* POLI, 1795, Test. ut. Sicil., II, p. 42, pl. 15, fig. 20 = *Mytilus solen* von SALIS MARSCHLINS, 1793, Reise Koen., p. 405, *vide* BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1898, Moll. Marins du Roussillon, vol. 2, p. 718; *vide* DALL, 1908, Mus. Comp. Zool. Harvard, Bull., vol. 43, no. 6, p. 361. Recent. Mediterranean, Adriatic, and Atlantic Ocean at Madiera and Senegal. CROUCH, 1826, Illus. Intro. Lamarck's Conch., pl. 4, figs. 8a, 8b interior; BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1898, Moll. Marins du Roussillon, vol. 2, pl. XCII, figs. 8-10

Subgenus *Petrasma* Dall, 1908

*Petrasma* DALL, 1908, Nautilus, vol. 22, no. 1, p. 2

Type species by original designation, *Solemya borealis* TOTTEN, 1834, Amer. Jour. Sci., ser. 2, vol. 26, p. 366, fig. 1, h, i. Living. Nova Scotia to Connecticut. GOULD, 1870, Invertebrata of Massachusetts, 2d ed., p. 50, fig. 372; MORSE, 1913, Biol. Bull., vol. XXV, p. 279, fig. 20; SMITH, 1937, East Coast Shells, p. 25, fig. 29a

*Solemya* (*Petrasma*) *valvulus* Carpenter

*Solemya valvulus* CARPENTER, 1864, April, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 311; Reprint, 1872, p. 210; 1864b, Aug., p. 618; Reprint, 1872, p. 104

*Solemya* (*Petrasma*) *valvulus* (Carpenter), DALL, 1908, Nautilus, vol. 22, no. 1, p. 2; 1908, Bull. Mus. Comp. Zool. Harvard, vol. XLIII, no. 6, p. 364; LAMY, 1909, Jour. de Conchyl., vol. LVII, no. 3, p. 208; DALL, 1921, p. 9; OLDROYD, 1924b, p. 11, pl. 40, fig. 10; Keen, 1937, p. 25; HERTLEIN AND STRONG, 1940, Zoologica, New York Zool. Soc., vol. XXV, pt. 4, p. 378; BURCH, 1944, no. 33, p. 7; 1945, no. 45, p. 3; VOKES, 1955, Jour. Paleont., vol. 29, no. 3, p. 536

A copy of the original description with translation was republished by Oldroyd (1924, p. 11). The following corrections should be inserted in Oldroyd's copy: line 6, insert "postice elongato" between "ligamento" and "antice"; read "cicatricibus" for "cicatricubus"; add "Long. .85, lat. .25, alt. .14 poll."

The synonymy and discussion of the species is not intended to be complete.

*Holotype*.—Not found. The type is not in the U. S. National Museum as reported by Oldroyd.

*Distribution*.—Cape San Lucas, Lower California (type); San Pedro, California, to Punta Penasco, Sonora, Mexico (Hertlein and Strong)

Family NUCULIDAE

Genus *Nucula* Lamarck, 1799

*Nucula* LAMARCK, 1799, Mem. Soc. Hist. Nat. Paris, p. 87

Type species by monotypy, *Arca nucleus* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 695. Neotype<sup>8</sup> of *N. nucleus* designated by SCHENCK, 1935, Malacol. Soc. London, Proc., vol. 21, pt. IV, p. 260, fig. 1. Recent. Europe.

<sup>8</sup>Neotype designated prior to the official recognition of "neotype" by the 14th Inter. Congress of Zoology (Copenhagen, 1953) may be validated by conforming to the provisions for establishing neotypes as formulated by that congress. (See Copenhagen decisions on Zool. Nomen., 1953, p. 28-32.)

***Nucula exiqua* Sowerby**

(Pl. 1, figs. 6, 7)

*Nucula exiqua* SOWERBY, 1833, Zool. Soc. London, Proc. 1832, pt. 2, p. 198; GRANT AND GALE, 1931, p. 111 in part; SCHENCK, 1939, Jour. Paleont., vol. 13, no. 1, p. 36, pl. 6, figs. 1-8, 11 figures of types; HERTLEIN AND STRONG, 1940, Zoologica, New York Zool. Soc., vol. XXV, pt. 4, p. 381 for synonymy, pl. 1, figs. 4, 5

*Nucula suprastrata* CARPENTER, ms. type U. S. Nat. Museum, No. 23247 *nomen nudum*; Redpath Museum, no. 15373

Not *Nucula suprastrata* ARNOLD, 1903, p. 96, pl. XVIII, fig. 6

*Nucula exiqua suprastrata* ARNOLD, WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 78 in part

As Grant and Gale (1931) and Schenck (1939) determined, Arnold (1903) must be credited with the name *Nucula suprastrata* and not Carpenter. The Pleistocene specimen figured by Arnold is the holotype (lost) of that species.

There is a manuscript type, no. 23247 in the U. S. Nat. Museum, of *N. suprastrata* consisting of two specimens labelled, "Catalina 30 fms. Cooper." The shells are opposite valves with the margins broken. The smaller and more complete of the two is figured herein. The photo shows the amount of reticulation in the sculpture. On the larger fragment the reticulation is stronger near the margin. The specimen figured falls within the measurements of *N. exiqua* Sowerby as enumerated by Schenck, but the length of the second type would reach at least 6 mm. There are in the Redpath Museum 6 specimens (including both valves), no. 15373, labelled "Nucula suprastrata Catalina Is. 30 fm. Cooper type," in Carpenter's handwriting.

The name of Carpenter has no nomenclatural status, and as suggested by Schenck the Recent specimens of Carpenter probably belong to *N. exiqua* Sowerby.<sup>9</sup>

Schenck limited *N. suprastrata* Arnold to the Pleistocene forms. Woodring, Bramlette, and Kew suggested that the California Recent and Pleistocene shells be separated from the living southern *N. exiqua* as a subspecies.

The figures and notes of the original specimens of "*N. suprastrata* Carpenter, ms." are included, because the name has been brought into literature by authors with conjecture as to its proper identity.

## Family NUCULANIDAE (Ledidae)

Genus *Nuculana* Link, 1807

(Leda Schumacher, 1817)

*Nuculana* LINK, 1807, Beschreib. Nat.-Samml. Univ. Rostock, p. 155

Type species by monotypy, *N. rostrata* (GMELIN), 1791, Systema Naturae, 13th ed., p. 3308; referred also to CHEMNITZ,<sup>10</sup> 1784, Neues Syst. Conchyl.-Cab., Bd. 7, p. 206, tab. 55, figs. 550, 551 = *Arca pernula* MÜLLER, 1779, Beschäft. Berl. Ges. Naturf. Freunde, v. 4, p. 57. Recent. Circumpolar. REEVE, 1871, Conch. Icon., Laeda, vol. 18, pl. 2, fig. 5a-c; SARS, 1878, pl. 5, figs. 1 a-d exterior and interior

Subgenus *Thestyleda* Iredale, 1929

*Thestyleda* IREDALE, 1929, Rec. Australian Mus., vol. 17, no. 4, p. 158, 187

Type species by original designation, *Leda ramsayi* E. A. SMITH, 1885, Challenger Rept., Zool., vol. XIII, p. 241, pl. XX, figs. 3-3a. Recent. Off Sydney, New South Wales, 950 fathoms

***Nuculana (Thestyleda) hamata* (Carpenter)**

(Pl. 2, figs. 4-6)

*Leda hamata* CARPENTER, 1864b, p. 612, 644; Reprint, 1872, p. 98, 130; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 210; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California,

<sup>9</sup>Type locality, "Bay of Caraccas," [Ecuador]. Carpenter, (1857b, p. 168), located the Bay of Caraccas in Ecuador, at 5°S. It is not to be confused with Caraccas, Venezuela, or Curaçao. The original notes of Sowerby stated, "*Hab.* ad Columbian Occidentalem (Bay of Caraccas)." See also synonymy, Hertlein and Strong, 1940, p. 381.

<sup>10</sup>Chemnitz did not use *rostrata* in a binomial sense but referred to species as "*Arca Martini rostrata*, . . ." which does not allow Chemnitz authorship of the species *Arca rostrata*. See also Opinion 184, Int. Com. Zool. Nomen., vol. 3, pt. 3, 1944.

p. 12; SOWERBY, 1871, Conch. Icon., *Laeda*, vol. 18, species 56, pl. 9, fig. 56 exterior; DALL, 1902, U. S. Nat. Mus., Proc., vol. 24, p. 558, pl. XL, fig. 9 exterior; ARNOLD, 1903, p. 97, pl. 17, fig. 4; PACKARD, 1918, Univ. California, Pub. Zool., vol. 14, p. 247, pl. 14, fig. 5 exterior; DALL, 1921, p. 11; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 7, pl. 25, fig. 4 copy Dall; 1924b, p. 23, pl. 6, fig. 4 copy Dall, pl. 37, fig. 5 exterior  
*Nuculana hamata* (Carpenter), GRANT AND GALE, 1931, p. 125, pl. 1, figs. 14, 15 exterior; BAILY, 1935, West Coast Shells (Keep), p. 43, 44, fig. 18 copy Dall; KEEN, 1937, p. 23  
*Nuculana (Thestyloda) hamata* (Carpenter), HERTLEIN AND STRONG, 1940, Zoologica, New York, Zool. Soc., vol. XXV, pt. 4, p. 400, pl. II, fig. 14 exterior; BURCH, 1944, no. 33, p. 11; 1945, no. 45, p. 4; ABBOTT, 1954, p. 339, fig. 26d

"Santa Barbara; Cat. Is., 20-60 fms.; common."— [Carpenter, 1864b, p. 612]

"Like *Steenstrupi* and *pernuloides*, but very hooked, sculpture strong. 20-60 fm. c. Cp." [Carpenter, 1864b, p. 644]

"I.t. "L. caudatae simili, sed valde hamata; planata, valde inaequilaterali; umbonibus angustioribus, laevibus, ad tridentem sitis; marginibus, dors. post. maxime incurvato, ant. parum, ventr. valde excurvatis; parte postica valde rostrata, rostro biangulato, curvato, angustiore, biangulata; sulcis et costis valdis, concentricis, supra rostrum continuis, dorsum versus postice obsoletis.

"Long. 0.37, lat. 0.10, alt. 0.10.

"State Collection, No. 984." [Carpenter, 1866a, p. 210]

The type material is in the U. S. National Museum, Cat. 107420, and consists of specimens in two vials. One vial contains two valves loose and two broken opposite valves. They have a label "Cp 984" which is the original "State Collection" number. The entire valves measure 9 mm., length; 5 mm., height; 1 mm., thickness (one valve) which corresponds fairly closely to Carpenter's measurements; 9.39 mm., long.; [lat. 0.10]<sup>11</sup>; 2.5 mm., t. (both valves), and also to the length indicated by Dall. The other vial in the same suite contains a double specimen with the label "type fig'd." The specimens measure 10 mm., length; 5 mm., height; 2½ mm., thickness (both valves). The label suggests that it was the specimen figured by Dall, but the measurement given by Dall is closer to that of the other specimen (Cp. 984).

According to the U. S. National Museum Catalogue, No. 107420 should include only one specimen. This suggests that the original specimen is the broken shell and that the complete specimens were added later, possibly by Dall who figured one. The specimen (pl. 2, fig. 6) is, therefore, chosen as the lectotype.

Although the exterior of the shells of this species has been frequently illustrated, the interior has not been figured heretofore. Dall (1916a, p. 397) named a subspecies *limata* off Santa Rosa, California.

*Lectotype*.—U. S. National Museum, No. 107420 ["Cp. 984"]

*Distribution*.—Recent. Catalina Island, California 20-60 fathoms (type); Santa Barbara, California; off Farallon Islands, 39-815 fathoms (Packard); off San Juan, Washington, 25-35 fathoms (Oldroyd); east of Cedros Island, Mexico, 45 fathoms (Hertlein and Strong). Pleistocene. California (Arnold; Oldroyd, 1924). Pliocene. California (Arnold)

#### Family ARCIDAE

#### Genus *Barbatia* Gray, 1842

*Barbatia* GRAY, 1842, Synopsis of the Contents of the British Museum, ed. 44, p. 81; 1847, Zool. Soc. London, Proc., p. 197

Type species by subsequent designation, GRAY, 1847, Zool. Soc. London, Proc., p. 197, *Arca barbata* LINNAEUS, 1758, p. 693. Recent. Mediterranean. BUCQUOY, DAUTZENBERG, AND DOLFFUS, 1891, Moll. Marins du Roussillon, t. 2, fasc. 18, pl. 32 figs. 1-5; REINHART, 1935, Bull. Musée roy. d'Hist. Nat. Belgique, t. XI, no. 13, p. 20, pl. 1, figs. b, b'

#### *Barbatia pernoides* (Carpenter)

(Pl. 1, figs. 4, 5)

*Arca pernoides* CARPENTER, 1856, Rept. British Assoc. Adv. Sci., p. 283, 310, 351

*Bysoarea pernoides* GOULD AND CARPENTER, 1856, Zool. Soc. London, Proc., p. 202; CARPENTER, 1860, Smith. Misc. Coll., v. 2, art. 6, checklist no. 1, p. 2; REINHART, 1943, Geol. Soc. Amer., Sp. Paper 47, p. 35, 36

<sup>11</sup>Appears to be an error here, for the height of the shell would not equal the thickness as indicated by Carpenter.

*Barbatia pernoides* (Carpenter), 1864b, p. 616; Reprint, 1872, p. 102 error original label; MAURY, 1922, Paleont. Amer., vol. I, no. 4, p. 40

*Acar pernoides* (Carpenter), STRONG, 1932, Nautilus, vol. XLVI, no. 1, p. 28 in part  
Not *Barbatia (Acar) pernoides* (Carpenter), REINHART, 1939, San Diego Soc. Nat. Hist., Trans., vol. IX, no. 10, p. 42, pl. 3, fig. 3a, 3b, 3c, 3d = *A. bailyi* BARTSCH, 1931, U. S. Nat. Mus., vol. 80, no. 2909, p. 2, pl. 1, 5 central figures

*Barbatia ? pernoides* (Carpenter), REINHART, 1943, Geol. Soc. Amer., Sp. Paper 47, p. 82.

*Arca (Acar) pernoides* Carpenter, BURCH, 1944, no. 34, p. 6, in part, not fig.

Not *Arca pernoides* Carpenter, BURCH, 1945, no. 45, p. 5 = *A. bailyi* Bartsch; BURCH, 1947, no. 75, p. 6

"1 valve. 'Lieut. Webb.'" [Carpenter, 1857b, p. 283]

"B. t. subquadrata, planata, albidia, epidermide spongiosa fusca induta; striis exilibus, radiantibus, confertissimis; minutissime tuberculosi; umbonibus obtusis, antice sitis, area parva: intus linea dentium maxime arcuata, dentibus extremis validis, interioribus parvis, confertis, quadratis; cicatr. musc. rotundatis, politis; pagina interna, intra lineam pallii, radiatim striata; margine simplici; ligamento fossis quadratis minutis confertis, haud dentibus convenientibus, sito, aream quoque tegente.

"Long. .68, lat. .53, alt. .32.

"Hab. San Diego (*Dr. Webb*). Valv. unic. in Mus. Gould.

"Somewhat resembling the fine variety of *B. solida*, but squarer, and known at once by the teeth and ligament. This is (under the glass) in minute pits, as in *Isognomon*, but with an extra layer covering the whole area." [Gould and Carpenter, 1856c, p. 202]

The critical reference in regard to this form is that of Carpenter (1864b, p. 616), in which he noted that the specimen, as well as that of 13 other names, had never been collected by Dr. Cooper or by members of the California Survey. In regard to *B. pernoides* Carpenter added that it was "very probably an error in Dr. Gould's label." In a letter from J. G. Cooper to Carpenter dated March 14, 1864<sup>12</sup> Cooper included a list of molluscan species which did not occur on the California coast. "*Byssoarca pernoides*" was one of them.

This shell is undoubtedly extraneous, and Carpenter was right in assigning the label of "San Diego" as an error.

There is a right valve in the Carpenter Collection in the Redpath Museum which has the label "*Barbatia ? pernoides* Cpr. PZS 1856, p. 202 ? Panama."

The shells measure 17 mm. length, 12 mm. height, and 5 mm. thickness. Carpenter's measurements of the holotype would be 17.2 mm. length, 13.4 mm. width, and 8.3 mm. thickness.<sup>13</sup> With the exception of the thickness the shell measures practically the same. It could well be the shell Carpenter described. In lieu of any authentic specimen this individual could serve as a neotype. A specimen labelled as type has not been found. The above-mentioned specimen is illustrated herein. This is not the *A. pernoides* illustrated by Burch nor specimens which the writer has obtained from collectors labelled "*A. pernoides* Strong." Those shells are much smaller and are different generically. They are the *Acar bailyi* Bartsch.

*B. pernoides* belongs more to the subgenus *Oliquarca* Sacco, 1898, by the arrangement of the ligamental area than it does to *Barbatia*, s.s. (Reinhart, 1935, p. 24, pl. II, figs. d,d').

*Holotype*.—not found

*Specimen figured*.—Redpath Museum

*Distribution*.—Correct locality unknown; not "San Diego;" ? Panama (Carpenter)

#### Family GLYCYMERIDAE

#### Genus *Glycymeris* da Costa, 1778

*Glycymeris* DA COSTA, 1778, Historia Naturalis Testaceorum Britanniae, p. 168-170

Type species by tautonymy, *Arca glycymeris* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 695;

LINNAEUS, 1767, Syst. Nat., p. 1143, no. 181. Recent. English Coasts. REEVE, 1843, Conch. Icon., *Pectunculus*, vol. 1, pl. III, figs. 12a-b

#### *Glycymeris subobsoleta* (Carpenter)

(Pl. 1, figs. 8-10)

*Avinaca* (? *septentrionalis*, Middl. var.) *subobsoleta* CARPENTER, 1864b Aug., p. 627, 644;

<sup>12</sup>In collection of Carpenteria, Redpath Museum, McGill University.

<sup>13</sup>See introduction to systematic descriptions. Carpenter's measurements would be multiplied by 25.3 mm. or 25.4 mm.

Reprint, 1872, p. 113, 130; 1864d, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 425; Reprint, 1872, p. 237; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 11  
*Glycymeris suboboleta* (Carpenter), PACKARD, 1918, Univ. California Pub. Zoology, vol. 14, p. 250, original Latin description translated; DALL, 1921, p. 15; OLDROYD, 1924, Univ. Washington, Pub. Puget Sound Biol. Station, vol. 4, p. 14 translation; 1924b, p. 42, in part, not pl. 40, figs. 8, 9, original description and translation; KEEN, 1937, p. 21; WILLETT, (1943) 1944, Southern California Acad. Sci., vol. XLII, pt. 3, p. 108, 111, pl. 12, figs. 1-3; BURCH, 1944, no. 34, p. 4; BURCH, 1945, no. 45, p. 5; BURCH, 1946, no. 59, pl. XII, fig. 41

*Glycymeris septentrionalis* (Middendorff) variety *suboboleta* (Carpenter), GRANT AND GALE, 1931, p. 134 in part

"Sculpture much fainter than in Midd.'s fig." [Carpenter, 1864b, p. 644]

A copy of the original description is in Oldroyd (1924b) with a translation in Packard (1921) which was reprinted in Oldroyd (1924; 1924b, vol. I). The following original lines should be added to those printed by Oldroyd to make the copy complete:

"*Hab.* Neeah Bay (*Swan*); Shoalwater Bay (*Cooper*).

"Middendorff's shell is figured with much stronger ribs, but may have been described from decorticated specimens." [Carpenter, 1864d, p. 237]

Correct line seven to read: "validis" for "validid"

Even allowing for variation, the specimens illustrated by Oldroyd seem to have several points of difference with the types. In review of this species the Oldroyd shell would bear critical examination.

Willett (1944, p. 111) diagnosed a change in the shell of the species of southern California.

The syntypes consist of two specimens labelled "Cotypes Neeah Bay, W. T., J. G. Swan."

*Syntypes*.—U. S. National Museum, No. 15594, two specimens

*Distribution*.—Recent. Neah Bay, Washington (type); Aleutian Islands, Alaska, to Lower California (Burch, 1945). Pleistocene. Southern California (Grant and Gale, 1931).

#### Family LIMOPSIDAE

##### Genus *Huxleyia* A. Adams, 1860

*Huxleyia* A. ADAMS, 1860, Ann. Mag. Nat. Hist., ser. 3, vol. 5, p. 303

Not preoccupied by *Huxleya*<sup>14</sup> DYSTER, 1858, or of CLAPARÈDE AND LACHMANN, 1858 (for references see NEAVE, 1939-1940). *Cyrilla* A. ADAMS, 1860, Ann. Mag. Nat. Hist., ser. 3, vol. 5, p. 478 was a substitute name for *Huxleyia* given by ADAMS who thought *Huxleyia* was preoccupied by *Huxleya*. *H. munita* (CARPENTER), herein discussed, has been known as *Cyrilla munita*.

Type species by monotypy, *Huxleyia sulcata* A. ADAMS, 1860, Ann. Mag. Nat. Hist., ser. 3, vol. 5, p. 303. Recent. Straits of Korea. A. ADAMS, 1868, Jour. de Conchyl., vol. XVI, p. 42, pl. IV, fig.

##### *Huxleyia munita* (Dall)

(Pl. 1, figs. 1-3)

*Pleurodon* (*Cyrilla*) *munita* Carpenter, DALL, 1898, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. IV, p. 599, 602; DALL, 1921, p. 14; OLDROYD, 1924b, p. 36 *munitum*

*Nuculina munita* (Carpenter, Dall), LAMY, 1912, Bull. Mus. Nat. d'Hist. nat., vol. 18, no. 7, p. 430, 431

*Nucula petriola* DALL, 1916, U. S. Nat. Mus., Proc., vol. 52, p. 395 holotype figured by SCHENCK, 1939, Jour. Paleont., vol. 13, no. 1, pl. 6, figs. 14, 15, under *Cyrilla munita*; OLDROYD, 1924b, p. 12

*Nucinella munita* (Dall), KEEN, 1937, p. 23, p. 20 under *Cyrilla*

*Cyrilla munita* (Dall), SCHENCK, 1939, Jour. Paleont., vol. 13, no. 1, p. 39, pl. 6, figs. 14, 15; HERTLEIN AND STRONG, 1940, Zoologica, New York Zool. Soc., vol. XXV, p. 419 "Carpenter in Dall"; BURCH, 1944, no. 33, p. 13; 1945, no. 45, p. 4; SCHENCK, 1945, Jour. Paleont., vol. 19, no. 6, p. 516, pl. 66, figs. 13-16; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 78; HOWARD, 1953, Wasmann, Jour. Biol., vol. 11, no. 2, p. 235, figs. C, D

*Nucinella* (*Huxleyia*) *munita* Dall, VOKES, 1956, Jour. Paleont., vol. 30, no. 3, p. 667

<sup>14</sup>Action by Inter. Zool. Com. Zool. Nomen., 1953. HEMMING, Copenhagen Dec. Zool. Nomen., 1953, p. 78, Art. 34 revoking Int. Rules Zool. Nomen. Opin. 147; see Bull. Zool. Nomen., vol. 4, 1950, pt. 4-6, p. 161-162. VOKES, 1956, p. 767.

This species was not described by Carpenter. The syntypes consisting of three specimens are in the U. S. National Museum. These were specimens Cooper collected and Carpenter labelled. Dall used Carpenter's name in 1898 and referred to the species as of Carpenter. Others have followed Dall (Howard, 1953). The species name should be credited to Dall only.

There are in the Redpath Museum no. 15374 two specimens labelled "Nuculina munita Catalina Is. 30 fm. Cooper type." These specimens cannot be termed syntypes because Dall did not have access to them when he described the species. They would be valuable topotypes because they came from the Cooper collection.

*H. munita* is not typical *Huxleyia*, but it belongs in that genus more than in *Nucinella*. The species lacks anterior teeth.

Oldroyd repeated Dall's description of the species (Oldroyd, p. 36). Rehder and Schenck pointed out that *Nucula petriola* Dall is synonymous with *C. munita*.

Howard (1953) reported the species to be viviparous.

*Syntypes*.—U. S. National Museum, no. 23243, three specimens, label "30 fms. Cooper, Catalina Is."

*Distribution*.—Recent. Catalina Island, 30 fathoms (type); Santa Rosa Island, California, 53 fathoms (*H. petriola*); Santa Rosa Island, California to ? Lat. 34° S. (Hertlein and Strong). Pleistocene (Woodring, Bramlette, and Kew)

#### Genus *Philobrya* Cooper, 1867

*Bryophila* CARPENTER, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 314; Reprint, 1872, p. 212. Not *Bryophila* TREITSCHKE, 1825 (see NEAVE, 1939-1940)

*Philobrya* COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 12; CARPENTER, Reprint, 1872, Smith. Misc. Coll., no. 252, index, p. 21

Type by monotypy, *P. setosa* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 12. Recent Forrester Island, Alaska, to Gulf of California (Pl. 1, figs. 11-16)

The name *Philobrya* was constructed by Carpenter and intended by him as a substitute for his preoccupied term *Bryophila*. Carpenter first published the name *Philobrya* in the index (1872) to the Smithsonian Reprint of many of his papers. Carpenter has always been credited as author of the generic name. However, as sometimes happens by an interchange of unpublished names between workers, Carpenter's replacement name of *Philobrya* was first published by Cooper (1867). Cooper, is, therefore, the author of the name. There is no indication in the Cooper list that the name is a manuscript name of Carpenter, so that there is no authority for crediting "Carpenter in Cooper."

Cotton and Godfrey (1938) placed this genus in the special family Philobryidae.

#### *Philobrya setosa* (Carpenter)

(Pl. 1, figs. 11-16)

*Bryophila setosa* CARPENTER, 1864, April, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 314; Reprint, 1872, p. 212; 1864b, Aug., p. 538, 612, 618, 645; Reprint, 1872, p. 24, 98, 104, 131

*Philobrya setosa* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 12; CARPENTER, Reprint, 1872, index, p. 21; DALL, 1895, U. S. Nat. Mus., Proc., vol. XVIII, p. 17; BERNARD, 1897, Jour. de Conchyl., vol. XLV, p. 10, text fig. 1-4, pl. 1, fig. 1; DALL, 1921, p. 17; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 15 translation; 1924b, p. 49, pl. 54, figs. 32-35; original description and translation; GRANT AND GALE, 1931, p. 149; KEEN, 1937, p. 24; BURCH, 1944, no. 34, p. 10; 1945, no. 45, p. 6; 1946, no. 59, pl. XI, fig. 34; HOWARD, 1953, Wasmann, Jour. Biol., vol. 11, no. 2, p. 234, 235, fig. A, B

The original description (with translation) of this interesting species has been given by Oldroyd, and details of the hinge have been discussed and illustrated by Bernard.

The following original lines should be added to the copy by Oldroyd to make it complete:

"Long. 13, lat. .2, alt. .1 poll.

"Like a minute *Pinna*, or a transverse *Margaritiphora* without ears, or an *Isognomon* without pits. Differs from the other Aviculids in being viviparous, like some other minute bivalves." [Carpenter, 1864a, p. 314] Line 4, correct "rectus" to read "rectis"; line 8, space following "marginem"

The type collection in the U. S. National Museum consists of 9 double specimens still on the original glass mounting of Carpenter with Carpenter's label "type" "C. S. Lucas."

Howard (1939) added further evidence to Carpenter's statement that the species is viviparous but agreed with Bernard that it is not parasitic as supposed by Dall.

*Dimensions*.—Length, 4 mm.; width, 3 mm. largest syntype; length, 1 mm.; width, .75 ± mm. next to smallest syntype

*Syntypes*.—U. S. National Museum, no. 16187

*Distribution*.—Recent. Cape St. Lucas, Lower California (Xantus) (type); Santa Barbara, "20 fm. Cp." (Carpenter); for California collecting data, see Burch, 1944, no. 34, p. 10; Forrester Island, Alaska, to Gulf of California (Dall). Pleistocene. San Pedro cut, Los Angeles County, California (Grant and Gale; Woodring, Bramlette, and Kew)

#### Family OSTREIDAE

#### Genus *Ostrea*<sup>15</sup> Linnaeus, 1758

*Ostrea* LINNAEUS, 1758, Syst. Natur., 10th ed., p. 696

Type species by subsequent designation, CHILDREN, 1823, vol. XV, p. 44, pl. III, fig. 94, 94a; KENNARD, SALISBURY, AND WOODWARD, 1931, Lamarck's Gen. Shells, p. 15; *O. edulis* LINNAEUS, 1758, Syst. Natur. 10th ed., p. 699. Recent. Europe. SOWERBY, in REEVE, 1870, Conch. Icon., vol. 18, *Ostrea*, pl. V, figs. 8a-f, BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1887, Moll. Marins du Rousillon, t. II, pl. 1, figs. 1-4; pl. 2, figs. 1-6 var.; pl. 4, figs. 1-4 var.; pl. 5, figs. 1-4 var.

#### *Ostrea conchaphila* Carpenter

*Ostrea conchaphila* CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856, p. 198, 233, 250, 277, 282, 312, 351, 353, 365 [?]; 1857, Cat. Mazatlan Shells, p. 161; 1856 [1857]<sup>16</sup> Zool. Soc. London, Proc., pt. XXIV, p. 220 in part; 1860, Smith, Misc. Coll., vol. 2, art. 6, p. 2; 1863, Zool. Soc. London, Proc., p. 363; Reprint, 1872, p. 199; 1864b, p. 552, 592, 646, 665, 666; Reprint, 1872, p. 38, 78, 132, 151, 152; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 13; SOWERBY, in REEVE, 1871, Conch. Icon., vol. 18, *Ostrea*, pl. XXVIII, figs. 69 a, b, c; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 256; BURCH, 1944, no. 34, p. 11; BURCH, 1945, no. 45, p. 6; PALMER, 1951, New York State Mus., Bull. no. 342, p. 29; HERTLEIN AND STRONG, 1955, Amer. Mus. Nat. Hist., Bull., vol. 107, art. 2, p. 179, pl. 3, figs. 29, 30

Although the range of this species extends into the California territory, the type is from the Mazatlan fauna. The illustration of the type, therefore, belongs with the figuring of the Mazatlan Catalogue and further discussion is retained for that report.

*Holotype*.—British Museum (Natural History)

*Distribution*.—Mazatlan, Mexico (type); Redondo Beach, California, to Panama (Burch, 1945)

#### *Ostrea lurida* Carpenter

(Pl. 5, figs. 4-6)

*Ostrea lurida* CARPENTER, 1864b, p. 599, 606, 615, 645; Reprint, 1872, p. 85, 92, 101, 131; 1865, Jour. de Conchyl., 13, p. 137; Reprint, 1872, p. 305; 1860, Smith, Misc. Coll., vol. 2, art. 6, p. 2 "[*lurida*]"; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 12; ? SOWERBY in REEVE, 1871, Conch. Icon., vol. 18, *Ostrea*, pl. IX, fig. 15; ARNOLD, 1903, p. 102; DALL, 1914, Nautilus, vol. 28, no. 1, p. 2 and varieties; PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 251, pl. 14, figs. 10a, 10b; pl. 42 San Francisco Bay stations; DALL, 1921, p. 18; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 16; OLDROYD, 1924b, p. 50, pl. 37, figs. 10a, 10b; GRANT AND GALE, 1931, p. 151 see for extended synonymy; COE, 1931, Science, vol. 74, no. 1914, p. 247-249; BAILY, 1935, West Coast Shells (Keep), p. 49; HOWARD, 1935, California oil fields, vol. 20, no. 4, pl. 7, fig. 5 Pliocene; HENDERSON, 1935, Geol. Soc. Amer., Sp. Paper, no. 3, p. 57; KEEN, 1937, p. 23; KEEN AND BENTSON, 1944, Geol. Soc. Amer., Sp. Paper, no. 56, p. 77; BURCH, 1944, no. 34, p. 11, fig. p. 12; FINCH, 1953, California Dept. Fish Game Marine Fish., Fish Bull. no. 90, p. 38, fig. 4; ABBOTT, 1954, p. 374, pl. 29, fig. f

<sup>15</sup> Placed in official list by Int. Com. Zool. Nomen., Opinion 94

<sup>16</sup> Title page of volume is dated 1856, but the article was published in 1857, because in the paper Carpenter refers to Mazatlan Catalogue (1857)



*Monociostrac vancouverensis* ORTON, 1928, Nature, vol. 121, no. 3044, p. 320-321 suggested new name

The list of references for this common West Coast oyster is not intended to be complete.

"*Ostrea edulis*, Coop. [non Linn.: = *O. lurida*, Cpr.] De Fuca and Puget Sound, Gibbs; Shoalwater Bay, Cooper. "Small in Puget Sound; finer in Shoalwater Bay, which supplies S. Francisco market; large at Vancouver's Island; very large near mouth of Hood's Canal." [Carpenter, 1864b, p. 599]

"*Ostrea lurida*. Esquimalt Harb., Lord. Dredged-up by Indians in small handnets with long handles, in 2-3 fm., on mud-flats." [Carpenter, 1864b, p. 606]

"*Ostrea*. The same species throughout to S. Franc.: S. Diego, Cooper. [Besides the typical northern shell, *O. lurida*, are well-marked ? var. *laticaudata*, *rufoides*, and *expansa*]." [Carpenter, 1864b, p. 615]

"*Ostrea lurida*, n.s. Shape of *edulis*: texture dull, lurid, olivaceous, with purple stains. 2-3 fm. on mud flats, Lord." [Carpenter, 1964b, p. 645]

Oldroyd gave the first paragraph of Carpenter's original description. The remainder follows herewith:

"*Animal flavore cupreo tinctum*.

"Var. *laticaudata*, Nutt. ms.: *t. omnino purpurea, margine producto, undato; cardinem versus, denticulis conspicuis instructo*.

"Hab. Vancouver Is., à 2-3 toises sur fond de vase, Lord; Shoalwater Bay, Cooper; Neeah Bay et Tatooche Is., Swan (Var.) Monterey, Nuttall.

.....

"Les Huitres de Californie, dans leur état ordinaire, comme on les trouve au Shoalwater Bay (Orégon), ont à peu près la couleur et l'aspect de petites *Ethérés*. Les individus des mers plus chaudes ont l'air d'être très-distincts; mais, d'après le docteur Cooper, qui a une grande expérience de la matière, ce ne sont que des variétés. Je ne pouvais pas prendre pour nom spécifique celui que le professeur Nuttall avait donné en manuscrit à une forme accidentelle. Quant aux autres formes, assez constantes dans leurs diverses localités, je leur ai donné des noms qui pourront servir à les désigner soit comme espèces, soit comme variétés, lorsque, plus tard, la connaissance d'un plus grand nombre d'individus permettra d'avoir une opinion définitive en ce que les concerne. La variété *rufoides* a beaucoup de l'aspect de l'*O. Virginica* (Maz. Cat., no. 212). Elle était désignée sous le nom ? *rufa* par le docteur Gould; mais je suis porté à croire que l'espèce de Lamarck est une variété des Huitres Atlantiques, attendu que les coquilles de la haute Californie n'étaient pas connues à l'époque où il a écrit." [Carpenter, 1865g, p. 137]

Of the material from several localities listed originally by Carpenter, two specimens from "Shoalwater Bay," collected by Cooper and labelled as type by Carpenter, are in the Redpath Museum at McGill University. Shoalwater, Willapa Harbor, Washington, therefore, becomes the type locality. The types have a greenish hue on the interior of the shell.

The specimen figured by Sowerby in *Conchologica Iconica* as *O. lurida* and said to come from Mazatlan is typical in shape, but either the locality or specific determination is incorrect.

*Syntypes*.—Redpath Museum, No. 125

*Distribution*.—Recent. [Cape] Shoalwater ["Bay"] northern Willapa Harbor, Washington (type); Sitka, Alaska, to Cape San Lucas, Lower California (Dall). Individual records may be referred to under Williamson (1892), Arnold (1903), Packard (1914). Grant and Gale (1931) list reference for ? Miocene-Pleistocene, but Keen and Bentson (1944) vouch only for Howard (1935) Pliocene. Pleistocene, San Pedro sand, Palos Verdes Hills, California, Woodring, Bramlette, and Kew (1946, p. 81).

#### *Ostrea lurida* forma *expansa* Carpenter

*Ostrea lurida* var. *expansa* CARPENTER, 1864b, p. 615, 646; Reprint, 1872, p. 101, 132; 1865, Jour. de Conchyl., XIII, p. 138; Reprint, 1872, p. 306; KEEP, 1887, West Coast Shells, p. 164 in part; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 193; KEEP, 1911, West Coast Shells, p. 56; DALL, 1921, p. 18; OLDROYD, 1924, p. 50; BAILY, 1935 West Coast Shells, (Keep) p. 49; KEEN, 1937, p. 23; BURCH, 1944, no. 34, p. 11; BURCH, 1945, no. 45, p. 6

*Ostrea* (*conchaph.* var?) *expansa* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 13

"*Ostrea* . . . [Besides the typical northern shell *O. lurida*, are well-marked ? vars., *laticaudata*, *rufoides*, and *expansa*]. [Carpenter, 1864b, p. 615]

"*Ostrea* ? var. *expansa*. Flat, affixed to whole surface, like *Columbiensis*. Round, or winged to left, or right, or both, like *Malleus*. Also passes into 167. *Ostrea conchaphila*, Cpr. Maz. Cat. no. 214. From Southern fauna." [Carpenter, 1864b, p. 646]

"? Var. *expansa*: t. omnino planata, per totam superficiem affixa; extus, marginem versus laminata, purpureo radiata; intus, olivaceo-rufa, ligamento parvo, in medio undato, solidiore. "Hab. S. Pedro, *Cooper*." [Carpenter, 1865g, p. 138]

The types of this *forma* have not been found. The Carpenter Collection in the Redpath Museum includes one double and an additional valve labelled by Carpenter from San Pedro, collected by Cooper. Since these are topotypes and in addition were collected by the original discoverer and identified by the original describer, one might well be selected as a neotype. They are flat, thin, and have a yellow hue.

*Dimensions*.—Length 55mm.; height 52 mm.

*Type*.—Not found

*Distribution*.—Recent. San Pedro, California (type); between San Pedro and San Diego, California (Carpenter); Monterey to San Diego, California (Burch)

#### *Ostrea lurida forma laticaudata* Carpenter

*Ostrea lurida* var. *laticaudata* CARPENTER, 1864b, p. 527, 615, 646, Reprint, 1872, p. 13, 101, 132; 1865, Jour. de Conchyl., vol. 13, ser. 3, vol. V, p. 137, Reprint, 1872, p. 305; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 13; KEEN, 1937, p. 23; BURCH, 1944, no. 34, p. 11; BURCH, 1945, no. 45, p. 6; HERTLEIN AND STRONG, 1946, Zoologica, New York Zool. Soc., vol. 31, pt. 2, p. 55 form usually referred to as *O. palmula* Carpenter, see DALL, 1921, p. 18; Oldroyd, 1924, p. 51; GRANT AND GALE, 1931, p. 152 in part

For Carpenter's remarks (1864b, p. 615) see under *O. lurida expansa*.

"*Ostrea* var. *laticaudata*, Nutt. MS. Purple, winged, waved; denticles near hinge. Passes towards *palmula*, Maz. Cat. No. 214, b." [Carpenter, 1864b, p. 646]

See also the original description of *O. lurida*.

*Type*.—Not found<sup>17</sup>

*Distribution*.—Puget Sound, Washington, to Gulf of California (Burch). (Type locality, southern part of range of the species, Station?)

#### *Ostrea lurida forma rufoides* Carpenter

*Ostrea lurida* var. *rufoides* CARPENTER, 1864b, p. 592, 615, 646; Reprint, 1872, p. 78, 101, 132; 1865, Jour. de Conchyl., vol. XIII, p. 138; Reprint, 1872, p. 306; KEEP, 1911, West Coast Shells, p. 56; DALL, 1914, Nautilus, vol. 28, no. 1, p. 2; BAILY, 1935, West Coast Shells (Keep), p. 49; BURCH, 1944, no. 34, p. 11 color form *O. lurida*

*Ostrea (Conchoph. var. ?) rufoides* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 13

". . . . Another species, elongated, solid, allied to *Virginica* var. [*rufoides*]. San Diego." [Carpenter, 1864b, p. 592]

"*Ostrea* ? var. *rufoides* = *rufa*, Gld. (non Lam.). Passing toward *Virginica*, jun. Thin, with umbos hollowed: reddish in scar-region. Also fossil." [Carpenter, 1864b, p. 646]

"? Var. *rufoides*: t. '*O. Virginicae*' jun. simili; sed tenuissima, luteo-rufa, intus rufo tincta; umbonibus concavis.

"Hab. S. Diego, *Cassidy, Cooper*. Fossile à San Pablo, 20 pieds au-dessus de la haute marée, *Newberry*." [Carpenter, 1865g, p. 138]

In the Carpenter Collection in the Redpath Museum are the following three suites of specimens labelled by Carpenter as this *forma*. The characters of the specimens correspond to the original remarks, but (3) is the only one which might be of the original collection.

- (1) Glass mount of 5 specimens; San Diego Bay, 8 fathoms Hemphill
- (2) Glass mount of 6 specimens; Catalina Island, 30 fathoms Cooper
- (3) Glass mount of specimen; fossil; San Pablo; Newberry

<sup>17</sup>Not in British Museum (Natural History) (G. L. Wilkins, Mollusca Section, May 22, 1950, personal communication).

Number (3) is probably the specimen listed by Carpenter in the original description ("also fossil"). If this specimen were not the fossil and in this case the supplementary material, it would be the logical specimen for the neotype. It seems better to select a Recent specimen for that category. In choosing a neotype from this material, one must balance the relative merits of suites (1) and (2). Specimens of (1) are topotypes but not by the original collector (Cassidy, Cooper), whereas specimens from (2) are by the original collector but not from the type locality. The Redpath Museum Collection is so far the only one which has yielded specimens identified by Carpenter. The U. S. National Museum does not contain specimens of the *forma* collected by Cassidy, Cooper, or Blake (H. A. Rehder, May 29, 1950, personal communication).

*Type*.—Not found

*Type locality*.—San Diego, California

#### Family PECTINIDAE

#### Genus *Pecten*<sup>18</sup> Müller 1776

*Pecten* MÜLLER, 1776, Zoologiae Danicae Prodrömus, p. XXXI, 248

Type species by subsequent designation, SCHMIDT, 1818, Versuch. Conch-Samml., p. 67, *Ostrea maxima* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 696. Recent. Northern Europe. REEVE, 1852, Conch. Icon., vol. 8, *Pecten*, pl. IX, fig. 38

#### Subgenus *Chlamys* Roeding in Bolten, 1798

*Chlamys* ROEDING in Bolten, 1798, Mus. Boltenianum, pars 2, p. 161

Type species by subsequent designation, HERRMANNSEN, 1846, Indicis Gen. Malacozoorum, vol. 1, p. 231, *Pecten islandicus* (Linnaeus) = *Ostrea islandicus* GMELIN, 1791, Syst. Nat., 13 ed., p. 3326 = *Pecten islandicus* MÜLLER, 1776, Zool. Danicae Prod., p. 248. Living. Circumboreal. Greenland to Cape Cod. Arctic to Puget Sound. ABBOTT, American Sea Shells, p. 365, pl. 27, fig. L

#### *Pecten* (*Chlamys*) *rubidus* Hinds

(Pl. 3, figs. 4-6)

*Pecten rubidus* HINDS, 1844, Zool. Voy. Sulphur, Moll., p. 61, pl. 17, fig. 5; REEVE, 1853, Conch. Icon., vol. 8, *Pecten*, pl. XXIII, fig. 90. Not *P. rubidus* MARTYN, 1784, Universal Conchologist

*Pecten Fabricii* Gould not Philippi, CARPENTER, 1864b, p. 574; Reprint, 1872, p. 60

*Pecten Hindsii* CARPENTER, 1864b, p. 574, 606, 645; Reprint, 1872, p. 60, 92, 131; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 58, ? var.

*Pecten hastatus* var. *Hindsii* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 12

*Pecten hericeus* var. *hindsii* Carpenter, WHITEAVES, 1887, Roy. Soc. Canada, Trans., vol. 4, sec. 4, p. 119; DALL, 1898, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. IV, p. 709

*Pecten hericeus* var. *navarchus* DALL, 1898, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. IV, p. 708, new name for *P. rubidus* Hinds, 1844

*Pecten* (*Chlamys*) *hastatus* Sowerby var. *Hindsii* Carpenter, ARNOLD, 1906, U. S. Nat. Mus., Prof. Paper, no. 47, p. 111, pl. XLIII, figs. 1, 2, 2a

Not ? *Pecten* (*Chlamys*) *Hindsii* Carpenter, DAUTZENBERG AND BAVARY, 1912, Siboga Exped., Les Lamellibranches, LIII b, p. 12

*Pecten* (*Chlamys*) *hindsii* Carpenter, DALL, 1914, Nautilus, vol. 27, no. 11, p. 122; 1921, p. 709 in part; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 17, pl. 23, figs. 3, 4; OLDROYD, 1924b, p. 53, pl. 7, figs. 3, 4; BURCH, 1944, no. 35, p. 6; BURCH, 1945, no. 45, p. 6

"*Pecten rubidus* Hinds," KEEP, 1911, West Coast Shells, p. 41

*Pecten islandicus* Müller variety *hindsii* Carpenter, GRANT AND GALE, 1931, p. 163 in part; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 80

*Pecten hindsii navarchus* Dall, BAILY, 1935, West Coast Shells (Keep), p. 52

"... Non *P. Fabricii* Gld. = *P. Hindsii*, jun." [Carpenter 1864b, p. 574]

"*Pecten rubidus*, Hds.' Vanc. Is., *Lyall*. [Hind's type in Br. Mus. appears to be the ordinary form, of which *P. hastatus* is *hericeus* is the highly sculptured var. This shell, which is more allied to *Islandicus*, may stand as *P. Hindsii*]." [Carpenter, 1864b, p. 606]

<sup>18</sup>For information on the *Pecten* Osbeck problem, see Tomlin (in Burch, 1944, p. 3)

"*Pecten* (? var.) *Hindsii*. Broader, ribs close, small, smooth, bifurcating. Passes from *hastatus* toward *Islandicus*." [Carpenter, 1864b, p. 645]

*Pecten rubidus* Hinds, 1844, was described from a specimen from Alaska (no definite place). This is not the *P. rubidus* Martyn (1784) Dall (1905, p. 415; Griffen, Sherborn, and Marshall, 1936, p. 30; Winckworth, 1929, p. 228) = *P. islandicus* Müller, 1776. Although Hinds (1844) and Reeve (1853) figured the species their illustrations do not reveal the fine details of sculpture.

Dall (1898) renamed *P. rubidus* Hinds because of the use of the name by Martyn (1784). Dall gave the new name *navarchus* to the species and designated it as a subspecies of *P. hericeus* Gould (1850). Martyn's name is eliminated<sup>19</sup> because his work (1784) is nomenclatorially inadequate, Hind's name is available and stands for the species. Dall's name of *navarchus* is unnecessary and falls in synonymy with *P. rubidus* Hinds. Chenu's republication in 1845 of Martyn does not validate the name of *P. rubidus* Martyn, Chenu, over *P. rubidus* Hinds, because it was a year later than that of Hinds.

*Pecten Hindsii* was the name given by Carpenter to the specimen identified by Dr. Wm. Baird as *P. rubidus* Hinds. The shell was from Vancouver. It had been collected by Dr. Lyall of H. M. Ship "Plumper" and had been deposited in the British Museum (Vancouver and Californian Table, sixth column, no. 28, *vide* Carpenter, 1864b, p. 604-606). The Lyall specimen Carpenter thought was not the same as *P. rubidus* Hinds. It is the Lyall specimen which would be the type of *P. Hindsii* Carpenter. Apparently that shell has been lost,<sup>20</sup> for it is not in the British Museum (Natural History) now. But *P. hindsii* Carpenter is now regarded as synonymous with *P. navarchus* Dall = *P. rubidus* (Burch, 1944, no. 35, p. 6) Hinds, so that the type of the former would become the type of the species. The type of *P. rubidus* Hinds has also been lost. Hind's shell came from Alaska (33 fathoms), which limits the type locality to the Alaskan area.

There are in the Carpenter Collection in the Redpath Museum 3 specimens labelled by Carpenter, "*Pecten Hindsii* Cpr. = *rubidus*, H. C. Sitka" and 6 specimens labelled by Carpenter, "*Pecten* (? var.) *Hindsii* Cpr. = *rubidus* var. H. Cum. not Hinds. Neeah Bay. Swan."

The 3 Redpath Museum specimens from Sitka, Alaska, measure respectively, 19 mm., 29 mm., 15 mm., width; 22 mm., 32 mm., 18 mm., height; 3 mm., 5 mm., 3 mm., thickness. Photographs of the 3 specimens are included herein.

In 1865 Carpenter included under *P. Hindsii* specimens collected by Kennerley from Puget Sound and Vancouver shells of Lord.

The above is not intended to be a discussion of *Pecten rubidus* Hinds, 1844, but only the history of the shells which Carpenter named which might be identified with Hind's species.

*Types*.—Unknown. In Carpenter's day (1863) they were in the British Museum (Carpenter, 1864b, p. 605, 606)

*Distribution*.—Alaska (type); Bering Sea to San Diego, California (Burch)

#### Subgenus *Plagiectenium* Dall, 1898

*Plagiectenium* DALL, 1898, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. IV, p. 696

Type species by original designation *Pecten ventricosus* SOWERBY,<sup>21</sup> 1842 (1847), *Thes. Conch.*, vol. 1, p. 51, pl. 12, figs. 18, 19, 26. Recent. West Coast Mexico and Central America

<sup>19</sup>Opinion 456, opinions and declarations rendered by the Int. Com. Zool. Nomen., 1957.

<sup>20</sup>L. R. Cox (*vide litt.*), W. J. Rees, and J. R. le B. Tomlin searched in the British Museum (Natural History) for the type of the *Pecten* in question. For Hinds shell of the Belcher collection see Tomlin, (1941, p. 158). Grant and Gale's (1931) statement that both *P. hindsii* and *P. navarchus* = *P. rubidus* Hinds were based on the same specimen is not correct.

<sup>21</sup>Regarded as not separable from *P. circularis* Sowerby (1835, p. 110) by Arnold (1906, p. 125), Hertlein (1935, p. 313), and M. Smith (1944, p. 52).

**Pecten (Plagiocentium) circularis aequisulcatus** Carpenter

(Pl. 3, figs. 1-3)

- Pecten ventricosus* var. *aequisulcatus* CARPENTER, 1864b, p. 536, 540, 592, 599; Reprint, 1872, p. 22, 26, 78, 85; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 12; DALL, Wagner Free Inst. Sci., Philadelphia, Trans., vol. III, pt. IV, p. 711
- Pecten aequisulcatus*, ? n.s. CARPENTER, 1864b, p. 645, 669, 684; Reprint, 1872, p. 131, 155, 170
- Pecten* (? var.) *aequisulcatus* CARPENTER, 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 179, Reprint, 1872, p. 280
- Pecten aequisulcatus* Carpenter, KEEP, 1887, West Coast Shells, p. 166, fig. 139; KÜSTER AND KOBELT, 1888, Conch. Cab., vol. 17, pt. 2, *Spondylus* and *Pecten*, no. 294, p. 269, tab. 71, figs. 1, 2; WILLIAMSON, 1902, So. California Acad. Sci., Bull., vol. 1, no. 5, p. 51-61, fig. IV-VI detailed description of animal and shell
- Pecten (Plagiocentium) ventricosus* ARNOLD, 1903, p. 114, pl. XI, figs. 3, 3a, 6, 6a
- Pecten (Plagiocentium) newsoni* ARNOLD, 1903, p. 113, pl. XI, figs. 1, 1a
- Pecten circularis* var. *aequisulcatus* Carpenter, KEEP, 1911, West Coast Shells, p. 39, fig. 19
- Pecten (Plagiocentium) circularis* Sowerby var. *aequisulcatus* Carpenter, ARNOLD, 1906, U. S. Geol. Sur., Prof. Paper, no. 47, p. 132, pl. L, figs. 1, 1a text figs. 1, 2 synonymy; DALL, 1914, Nautilus, vol. 27, no. 11, p. 122; OLDROYD, 1924b, p. 58, pl. 42, figs. 1, 2 Arnold's figs. section; BURCH, 1944, no. 35, p. 11, fig.; BURCH, 1945, no. 45, p. 6
- Not ? *Pecten (Acquiptecten) aequisulcatus* Carpenter, DAUTZENBERG AND BAVAY, 1912, Siboga-Expeditie, Les Lamellibranches, LIIIb, p. 19
- Pecten (Chlamys) circularis aequisulcatus* Carpenter, DALL, 1921, p. 19 section *Plagiocentium*
- Pecten (Acquiptecten) gibbus* Linnaeus var. *circularis* GRANT AND GALE, 1931, p. 218 in part
- Pecten (Acquiptecten) circularis aequisulcatus* BAILY, 1935, West Coast Shells (Keep), p. 52, fig. 23; HERTLEIN, 1935, California Acad. Sci., Proc., vol. XXI, no. 25, p. 313
- Plagiocentium circularis aequisulcatum* (Carpenter), FINCH, 1953, California Fish Game Marine Fish., Fish Bull., no. 90, p. 42, fig. 8

For other references, see Arnold, 1906; Grant and Gale, 1931, in part; Keen, 1937, p. 19 under *Chlamys*; Hertlein and Strong, 1946, p. 58

The types of this species consist of one valve, left marked "type," and one double specimen, in the U. S. National Museum, no. 15645, with the label "San Diego." In regard to the statement of Mrs. Oldroyd concerning the Boyce Collection, see the introduction to this paper. The note as to the whereabouts of the types in the British Museum in Grant and Gale was a supposition. Arnold gave a fine photograph of a typical specimen in the U. S. Nat. Museum, no. 172703, but that specimen is not the type. Oldroyd (1924b) copied Carpenter's original description (1865h). In addition to that description Carpenter stated:

"*Hab.* Sta. Barbara (*Jewett*); S. Diego (*Cassidy, Newberry, Cooper*)."

He identified the species amongst the collection of Major Rich, from "Near S. Pedro." [Carpenter, 1864b, p. 540]

*Dimensions*.—Length, 84 mm.; height, 80 mm.; thickness (1 valve), 14 mm. left valve, "type"; length, 69 mm.; height, 64 mm.; thickness (double), 35 mm.

*Syntypes*.—U. S. National Museum, no. 15645

*Distribution*.—Recent. San Diego, California (type); Monterey Bay, California, to Cape San Lucas, Lower California (Finch, 1953). For Pliocene and Pleistocene, see Table 2 for stratigraphic distribution.

Subgenus **Leptopecten** Verrill, 1897

*Leptopecten* VERRILL, 1897, Connecticut Acad. Sci., Trans., vol. X, pt. 1, p. 69

Type species by original designation, *Chlamys monotimeris* (Conrad), 1837, Acad. Nat. Sci. Philadelphia, Jour. vol. 7, p. 238, pl. 18, fig. 10. Recent. Monterey, California, to Gulf of California. OLDROYD, 1924b, pl. 40, figs. 1, 2

**Pecten (Leptopecten) paucicostatus** Carpenter

*Pecten paucicostatus* CARPENTER, 1864b, p. 536, 614, 645; Reprint, 1872, p. 22, 100, 131; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 179; Reprint, 1872, p. 281; KÜSTER AND KOBELT, 1888, Martini-Chemnitz, Conchyl. Cab., vol. 17, pt. 2, p. 281. Not *P. prototranquebaricus paucicostatus* VREDENBURG, 1928 = *P. p. noeltingi* HERTLEIN, 1936, Nautilus, vol. 50, p. 54

- Pecten (Plagiocentrum) paucicostatus* Carpenter, ARNOLD, 1906, U. S. Geol. Sur., Prof. Paper, 47, p. 137, pl. XXXIX, figs. 3, 3a, 4 types  
*Pecten (Chlamys) paucicostatus* Carpenter, DALL, 1921, p. 19, section *Leptopecten*; OLDROYD, 1924b, p. 56, pl. 41, figs. 4, 5, section *Leptopecten*  
*Pecten (Aequipecten) tumbezensis* d'Orbigny, GRANT AND GALE, 1931, p. 206 in part  
*Pecten (Leptopecten) tumbezensis* d'Orbigny, HERTLEIN, 1935, California Acad. Sci., Proc., ser. 4, vol. XXI, p. 315, 316; HERTLEIN AND STRONG, 1946, Zoologica, Sci. Cont. New York Zool. Soc., vol. 31, pt. 2, p. 60

Arnold's (1906) doubt concerning the correctness of the original label of "Santa Barbara," and lack of specimens in later collections from California, has led authors to believe that this species has not been found north of the Gulf of California. Grant and Gale (1931), Hertlein (1935), and Keen (1937, p. 19) made a reasonable inclusion under *P. tumbezensis* d'Orbigny, 1846.

Two syntypes of *P. paucicostatus* Carpenter, No. 15643b, labelled "Types Sta. Barbara Jewett Cooper Catalina Id.," are in the U. S. National Museum. There are also two syntypes in the Redpath Museum, No. 121, labelled by Carpenter "Type" Sta. Barbara "Jewett (? Nicaragua)." Thus Carpenter had doubt about the shells coming from Santa Barbara.

Arnold figured the U. S. National Museum types, and writer has photographs of those which are at McGill University. The illustrations and further discussion are reserved for that of the Carpenter types from the fauna south of California.

"*Pecten* (? var.) *squarrosus*" Carpenter

(Pl. 2, figs. 1-3)

*Pecten squarrosus* CARPENTER, 1864b, p. 536; Reprint, 1872, p. 22

*Pecten* (? var.) *squarrosus* CARPENTER, 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 179; Reprint, 1872 p. 281

"P. testa orbiculari, aequaliter, rubida, albido, maculata; valva dextra convexa; costis XVIII, aequalibus, testa jun. approximatis, testa adulta interstitiis aequalibus; costis et interstitiis regulariter undatis, striis crebris squamosis radiantibus ubique ornata; auriculis magnis, latissimis, subaequalibus; antica anguste fissata, serrata, postica sinuata; auriculis ambabus et regione contigua scabrose striatis: intus alba, linea cardinali alte sulcata. Long. 1.82, lat. 1.79, alt. .9.

"Hab. 'Sta. Barbara,' teste Jewett.

"Resembles a shell in Mus. Cuming, marked 'exasperatus, var.', but does not agree with the diagnosis of that species. All Col. Jewett's valves were dextral. The locality needs confirmation." [Carpenter, 1865h, p. 179]

This species apparently does not belong in the West Coast fauna, but its proper place has not been established. Reference has not been made to it since Carpenter (1865h). At that time he doubted its proper locality. In the Redpath Museum there are three specimens, two right and one left valve marked type by Carpenter, with "Sta. Barbara Jewett." In addition Carpenter labelled the specimen "Also really Florida."

Carpenter in the original description stated that all Col. Jewett's specimens were dextral.

The left valve at McGill would then be eliminated from type material. Photos of the McGill right valves are included herein. They represent two different species. The shell of Figures 2 and 3 of Plate 2 bears a resemblance to the holotype of *P. heliacus* Dall (1925b, p. 119-120) as figured in Maxwell Smith (1937, pl. 9, figs. 5a, 5b) and the specimen of Figure 1 to the holotype of *P. acanthodes* Dall (in Smith, 1937, pl. 9, fig. 3). If either of the specimens under Carpenter's name proved conspecific with one of Dall's, Carpenter's name would have priority.

Family LIMIDAE

"*Lima orientalis* Carpenter"

Carpenter inadvertently credited as author of *Lima orientalis* in MONKS, 1893, Nautilus, vol. 7, no. 7, p. 75 copied in COOKE, 1915, Malacol. Soc. London, Proc., vol. 11, p. 108. *Lima orientalis* ADAMS AND REEVE, 1850, not CARPENTER, is *Lima (Mantellum) dehiscens* CONRAD, 1837

## Family MYTILIDAE

Genus *Modiolus* Lamarck, 1799<sup>22</sup>(*Volsella* Scopoli, 1777, p. 397)*Modiolus* LAMARCK, 1799, Mem. Soc. Hist. nat. Paris, p. 87

Type species by absolute tautonymy, *Mytilus modiolus* LINNAEUS, 1758, Syst. Nat., p. 706. Living. Circumboreal. Northern Europe, western Atlantic from the Arctic to northeast Florida (ABBOTT, 1954); Eastern Pacific from the Arctic to San Pedro, California (DALL, 1921). REEVE, 1857, Conch. Icon., *Modiola*, vol. X, pl. I, fig. 1, fig. 2; ABBOTT, 1954, p. 351, fig. 26j

For extended bibliography of *Modiolus modiolus* (L.), see Dautzenberg and Fischer (1912, p. 363-366), as *Volsella*.

*Modiolus fornicatus* (Carpenter)

(Pl. 4, figs. 10-12)

*Modiola fornicata* CARPENTER, 1864b, p. 536, 643; Reprint, 1872, p. 22, 129; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 179; Reprint, 1872, p. 280; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 11; 1870, Amer. Jour. Conch., vol. VI, p. 55; KEEP, 1887, West Coast Shells, p. 173; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 191

*Modiolus fornicatus* (Carpenter), ARNOLD, 1903, p. 120; KEEP, 1911, West Coast Shells, p. 36 ("Gld."); DALL, 1921, p. 22; OLDROYD, 1924b, p. 69; KEEN, 1937, p. 22; SOOT-RYEN, 1955, Allan Hancock Pac. Exped., vol. 20, no. 1, p. 62, pl. 6, fig. 26

*Volsella fornicata* (Carpenter), GRANT AND GALE, 1931, p. 251; BURCH, 1944, no. 36, p. 14; 1945, no. 45, p. 8; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 171

"Short, swollen, like large *M. marmorata*; but smooth, not crenated." [Carpenter, 1864b, p. 643]

The description of 1865 of this species was reprinted by Oldroyd. Her statement that the type is in Mrs. Bryce collection in Utica, New York, is out of date and should not be continued.

The following should be added to make the copy in Oldroyd complete:

"Long. 1.4, lat. .76, alt. .95.

"*Hab.* Sta. Barbara (*Jewett*); Monterey (*Taylor*)." [Carpenter, 1865h, p. 179]

The holotype, one specimen of both valves, is in the Redpath Museum. The glass tablet upon which it is mounted has in Carpenter's handwriting, "Type. Col. Jewett, Sta. Barbara."

The holotype, therefore, represents the first specimen mentioned by Carpenter, *i.e.*, the one collected by Col. Jewett.

*Holotype*.—Redpath Museum, no. 3133

*Distribution*.—Recent Santa Barbara, California (type); Monterey, Trinidad to San Pedro and Cortez Bank, California (Dall, 1921). Reported from Pliocene and Pleistocene of California and Pleistocene of Lower California (Grant and Gale, 1931).

"*Modiola planata*" Carpenter

"*Modiola planata*" Carpenter is a *nomen nudum*. The type material consists of three double valves in the Redpath Museum (No. 108). They are on the original glass mounts and were labelled by Carpenter "MS. type Beach at Panama Bradley." Photographs of the types are in the author's collection. The discussion of the name will be reserved for the paper on the Carpenter types of the Panama and Lower California region. Tomlin used the name in his list (1928, p. 192), stating that he had taken the name from the British Museum collections. The name, of course, has no validity. The specimens belong in the group of *Modiolus* of "*Modiola speciosa*" (Dunker) (Reeve, 1857, vol. X, *Modiola*, pl. VII, fig. 35).

"*Modiola nitens*" Carpenter

"*Modiola nitens*" Carpenter, 1857, in GOULD AND CARPENTER, Zool. Soc. London, Proc. pt. XXIV, p. 202; CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856, p. 227, 309, 349;

<sup>22</sup>*Modiolus* Lamarck, 1799, has been validated, and *Volsella* Scopoli, 1777, suppressed (Opinion 325, Opinions and Declarations rendered Inter. Com. Zool. Nomen., vol. 9, pt. 16, p. 251-266, 1955).

1860, Smith Misc. Coll., vol. 2, art. 6, p. 2; 1864b, p. 535, 564, 616; Reprint, 1872, p. 21, 50, 102

This specific name and description which Carpenter inserted in literature in 1857 pertained to specimens in the Gould collection labelled from California. That information was stated by Carpenter (1964b), in three respective notations, to be probably an erroneous Cumingian label. Carpenter (1864b, p. 535) suggested that the species was = *M. subpurpurcus* Mus. Cum.

*Volsella subpurpurca*, a specimen in the Cuming Collection, was described by Dunker (1856, p. 362) from Senegal. The Mus. Cuming specimen was figured by Reeve (1857, *Modiola*, vol. X, pl. VIII, fig. 44). That specimen may be the one referred to by Carpenter in comparison. It is not the same as the species figured by Reeve (1857, pl. V, figs. 23, 24) as *Modiola nitens* Carpenter, which name was applied to other specimens in the Museum Cuming. Reeve referred *M. nitens* Carpenter to the Mazatlan Catalogue which is not the place of description. The type of *M. nitens* was from the Gould Collection. Its whereabouts has not yet been traced.

#### Genus *Adula* H. and A. Adams, 1857

*Adula* H. AND A. ADAMS, 1857, Genera of Recent Mollusca, vol. II, p. 517. Not *Adula* ADAMS, 1861, Zool. Soc. London, Proc., p. 145  
Type species by monotypy, *Mytilus soleniformis* D'ORBIGNY, 1846, Voy. Amer. Merid., p. 649. Living. Paita, Peru. D'Orbigny, 1846, Voy. Amer. Merid., pl. 85, figs. 17, 18

#### *Adula californiensis* (Philippi)

(Pl. 4, figs. 1-4)

*Modiola californiensis* (Eschscholtz), PHILIPPI, 1847, Zeitschr. Malak. 1847, 4 p. 113  
*Lithophagus* sp. ind., like *falcatus* WM. COOPER, 1860, N. Pac. R.R., Rept. Mollusca, app. no. 6, p. 380 *vide* CARPENTER, 1864b, p. 599  
*Adula stylina* Carpenter, 1864b, Aug., p. 599, 627, 644, 669; Reprint, 1872, p. 85, 113, 130, 155; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 425; Reprint, 1872, p. 237; J. G. COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 11; PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 260, pl. 18, fig. 5  
*Botula (Adula) californiensis* Philippi, DALL, 1916, Nautilus, vol. 30, no. 1, p. 2; DALL, 1921, p. 22; OLDROYD, 1924b, p. 71, pl. 27, fig. 5 same fig. as PACKARD; BURCH, 1944, no. 37, p. 6; BURCH, 1945, no. 45, p. 8  
*Adula californiensis* Philippi, SOOT-RYEN, 1955, Allan Hancock Pac. Exped., vol. 20, no. 1, p. 90, pl. 9, fig. 50, text figs. 73-74

"M. testa subcylindrica, laevigata, rufofusca, in medio ab umbonibus ad marginem ventralem utrinque impressa; costa elevata, obtusa, ab apice ad extremitatem posticam decurrente; apicibus ad 1/7-1/8 longitudinis sitis. Long. 17", alt. 4 1/2"; crass. 5 1/2".

"*Modiola* (*Pholas lapsus calami*) *californiensis* Eschsch. in Musaeo Dorpatensi.

"Patria: California, legit cl. Eschscholtz.

"Species insignis, intermedia inter *Lithophagos* sic dictos et *Modiolam cinnamomeam* affinesque. Forma fere exacte cylindrica, sed margo ventralis aliquantulum concavus. Umbones prominuli, in specimine unico, quod examinandum mihi benevole communicavit cl. de Middendorff, decorticati. Costa obtusissima ab apice ad extremitatem posticam decurrens valde distincta, ita ut maxima crassities non in apicum regione sed in dimidia longitudine sit. Ante illam depressio notabilis. Extremitas postica subtruncata, linea oblique adscendente in marginem dorsalem rectilineum transit; antica angustior adscendens rotundata est. Musculus adductor anticus satis magnus." [Philippi, 1847, p. 113]

"Shorter, broader; epidermis brown, glossy." [Carpenter, 1864b, p. 644]

"A. testa cylindracea, lithophogoidea, laevi, tenuissima, parum arcuata, subnacre, albidula, postice interdum livido tincta; epidermide nitene, laevi, solidiore, nigro-fusca; testa jun. typice modiolaeformi, umbonibus subanticis, obtusissimis; margine dorsali antice (rarissime paululum, testa minima, postice) tenuiter crenulato; testa adulta marginibus dors. et ventr. fere parallelis, ant. et post. rotundatis; umbonibus detritis, haud conspicuis, circiter sextantim antice sitis; incrustatione haud solida, densissime spongiosa, aream posticam diagonalem tenente, supra valvas prolongata, appressa; ligamento interno, postice valde prolongato; pagina interna pallida; cicatr. add. postica tumida, pyriformi, antica (quoad familiam) maxima, haud impressa, oblonga; cicatr. pedali antica magna, circulari, impressa; callositate subumbonal (testa jun.) cicatr. pedalem versus conspicua. Long. .155, lat. .4, alt. .5.



"Variat t. magis arcuata; et in *A. falcata*, antice tumidiore, subangulata.

"Variat quoque teste attenuata.

"Variat interdum ventraliter late hianti.

"Hab. Neeah Bay, abundant (*Swan*); Monterey (*Taylor*).

"On smashing a large lump of hard clay, bored by Pholads, Petricolids, etc., large numbers of this species, with a few of *A. falcata*, of all ages from .06 onwards, were found *in situ*. Several struggled for room in a single crypt. The umbos are abraded by the wide opening of the valves." [Carpenter, 1864d, Dec., p. 425]

The translation as given by Oldroyd is that of Carpenter's (1864d, Dec., p. 425) description and not of Philippi as she indicated. There is a large amount of text omitted from the Latin description of Carpenter as published by Oldroyd. The complete original description of Carpenter, and the description of Philippi are therefore included herein.

The specimens marked by Carpenter as type of *Adula styliua* Carpenter and preserved in the Redpath Museum are from San Diego collected by Hemphill. The lot consists of 16 double specimens. These are not from the two localities, Neah Bay, Washington, or Monterey, California, mentioned in the original description. Strictly, therefore, these specimens are not from the type locality. Hence in choosing a neotype that material from San Diego, California, cannot be used. The value of the material is that it was identified and labelled by Dr. Carpenter. Specimens from either Neah Bay or Monterey designated as type have not been found. The type locality of *M. californiensis* is California and not Vancouver Island, as stated by Oldroyd.

*Type*.—*B. californiensis* Philippi unknown; *B. styliua* Carpenter unknown

*Distribution*.—Recent. California (type), *B. californiensis*; Neah Bay, Washington, or Monterey, California (type), *B. styliua*; Vancouver Island, British Columbia, to San Diego, California (Burch)

#### Family THRACIIDAE

#### Genus *Asthenothaerus* Carpenter, 1864

*Asthenothaerus* CARPENTER, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 311; DALL, 1886, Mus. Com. Zool., Bull., vol. XII, no. 6, p. 308

Type species by monotypy *A. villosior* CARPENTER, 1864, Ann. Mag. Nat. Hist. ser. 3, vol. XIII, no. 6, p. 311. Recent. Western America. Pl. 4, figs. 5-9.

This American genus is limited to the type species of the genus and two species from the Recent, Floridian region. The subgenus *Bushia* Dall (1886, p. 309) is represented by the living *A. elegans* Dall (1886, p. 309; 1889, pl. XXXIX, fig. 1) in Florida and the West Indies, *A. duboisi* Fulton (1930, p. 17) from Argentina, and *A. panamensis* Dall (1890a, p. 275).

#### *Asthenothaerus villosior* Carpenter

(Pl. 4, figs. 5-9)

*Asthenothaerus villosior* Carpenter, 1864b, April, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 311; Reprint, 1872, p. 104, 209; 1864b, Aug., p. 618 (list); CONRAD, 1869, Cat. Family Anatinidae, Acad. Nat. Sci. Philadelphia, p. 56; DALL, 1886, Mus. Comp. Zool., Bull., XII, p. 308 discussion of genus; DALL, 1916, U. S. Nat. Mus., Proc., vol. 49, no. 2116, p. 446; DALL, 1921, p. 25; OLDROYD, 1924b, p. 86; KEEN AND FRIZZELL, 1939, West North American Pelecypod genera, p. 8, fig. 5 (holotype); BURCH, 1944, no. 37, p. 14, 16, fig. (from Keen); no. 38, p. 16; 1945, no. 45, p. 9; SCHENCK, 1945, Jour. Paleont., vol. 19, no. 5, p. 516, pl. 66, figs. 11, 12 holotype

The original description of this species is included in Oldroyd.

As may be noted by the illustrations of the holotype, the shell of this species is thin and fragile. There are no teeth, and the hinge line and margins of the shell beneath the beak are synonymous. The white spongy ossicle inside beneath the beak, extending posteriorly, may be seen on the holotype, if the shell is tipped.

*Holotype*.—U. S. National Museum, no. 16292. The specimen was attached to Carpenter's original glass mount and bears his writing, "Type C. S. L."

*Distribution*.—Cape San Lucas, Lower California (type); San Pedro, California, to Cape San Lucas (Dall)

Family PANDORIDAE

Genus *Pandora* Hwass in Chemnitz,<sup>23</sup> 1795

*Pandora* HWASS in CHEMNITZ, 1795, Neues Syst. Conchyl. Cab., vol. 11, p. 211

Type species by subsequent designation,<sup>24</sup> DALL, 1903, Wagner Free Inst. Sci. Philadelphia, Trans., vol. 111, pt. 6, p. 1517, *Pandora inaequivalvis* (LINNAEUS), 1758, Syst. Nat., p. 673, as *Solen*: LINNAEUS, 1767, Syst. Nat., XII, p. 1118 as *Tellina*. Recent. Mediterranean.<sup>25</sup> BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1898, Moll. Marins du Roussillon, p. 723, pl. XCVIII, figs. 1-6

Subgenus *Pandorella* Conrad, 1863

(*Kennerlia* Carpenter, 1864)

*Pandorella* CONRAD, 1863, Acad. Nat. Sci. Philadelphia, Proc. 1862, p. 572; *Kennerlia*<sup>26</sup> CARPENTER, 1864b, Aug., p. 602, 638; Reprint, 1872, p. 88, 124; 1864, Nov., Zool. Soc. London, Proc., p. 602; Reprint, 1872, p. 231; 1865, Acad. Nat. Sci. Philadelphia, Proc., p. 55. Type species by subsequent designation, STOLICZKA, 1871, Mem. Geol. Soc. Indica, ser. 6, vol. 3, p. 61 *K. bicarinata* CARPENTER, 1864 = *K. bilirata* (CONRAD), 1855. See herein.

Type species [*Pandorella*] by monotypy, *Pandora arenosa* CONRAD, 1834, Acad. Nat. Sci. Philadelphia, Jour., ser. 1, vol. 7, p. 130. Recent. Hatteras to Yucatan. Miocene, Virginia. Pliocene, Florida. Gardner, 1943, U. S. Geol. Sur., Prof. Paper 199A, p. 45, pl. 10, figs. 16, 19, 20

Because the name *Kennerlia* is so entrenched in the literature the explanation of details connected with the name is not out of place.

Vokes (1956, p. 763) showed that *Pandorella* Conrad, 1863, preoccupies the well-known name of *Kennerlia* Carpenter, 1864. If the type species of *Pandorella*, *P. arenosa* Conrad, is accepted as consubgeneric with *K. bilirata* Conrad (*K. bicarinata* Carpenter) as indicated by Dall (1903), Johnson (1934), Gardner (1943), and Aguayo and Jaume (1948) then *Kennerlia* falls in synonymy with *Pandorella*. It is not true (Vokes, 1956, p. 763) that *P. arenosa* has been accepted by all subsequent authors as *Kennerlia*. The most recent publications (Poirier, 1952; Abbott, 1954; Perry and Schwengel, 1955) do not have the species so classified. The character of the shell and hinge are similar to "*K.*" *bilirata* (Conrad). (See pl. 6, figs. 1-3.)

*Pandora* (*Panderella*) *bilirata* Conrad

(Pl. 5, figs. 1-3)

*Pandora bilirata* CONRAD, 1855, Acad. Nat. Sci. Philadelphia, Proc., vol. 7, p. 267; 1857, U. S. Pacific R. R. Repts., vol. 6, Geol. Rept., p. 73, pl. V, fig. 25

<sup>23</sup> Int. Com. Zool. Nomen., Opinion 184, 1944

<sup>24</sup> Jeffreys, J. G.: (1865, p. 23) might be construed as a designation of type although he did not mean his statement to be so. He regarded the type species as originally designated. The designation of Children (1823) same species as above, was for *Pandora* Lamarck, 1799.

<sup>25</sup> Winckworth (1934, p. 53) regarded the Mediterranean as the locality for *P. inaequivalvis*. He limited the Atlantic distribution, often included for Linnaeus species, to *P. albida* (Roeding).

<sup>26</sup> Regardless of whether the spelling of the name of this subgenus should conform to the spelling of the name of Dr. Kennerley (spelled both Kennerley and Kennerly by Carpenter, 1864b, p. 601-602; Reprint, 1872, p. 85, 86; 1864c, p. 602-603; Reprint, 1872, p. 231, 232 footnotes) the original spelling of Carpenter should be maintained. Carpenter spelled the name *Kennerlia* in many and all instances so that he apparently preferred and meant that combination.

Dall emended the emendation of Fischer (1887, p. 1158) from *Kennerleya* to *Kennerleyia* and *Kennerlyia*. Apparently the revisers could not agree on the proper spelling. Dall returned to the original spelling in 1921 and has been followed by authors since.

Carpenter's first mention (1864b, p. 602) of *Kennerlia* included only the species *K. filosa*, but the specific name was still a manuscript name. In the next references (1864b, p. 638; 1864c, p. 602) more than one species was identified.

- Pandora* (*Kennerlia*) *bicarinata* CARPENTER, 1864b, Aug., p. 638; Reprint, 1872, p. 124; 1864, Nov., Zool. Soc. London, Proc., p. 603; Reprint, 1872, p. 232; 1869, Cat. Family Pandoridae, Acad. Nat. Sci. Philadelphia, p. 71; ARNOLD, 1903, p. 123, pl. XVIII, fig. 2
- Kennerlia bicarinata* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 4
- Pandora* (*Kennerlyia*) *bilirata* Conrad, DALL, 1915, U. S. Nat. Mus., Proc., vol. 49, no. 2116, p. 449; OLDROYD, 1924b, p. 89, pl. 53, figs. 8, 9
- Pandora* (*Kennerlia*) *bilirata* (Conrad), DALL, 1921, p. 26; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 30; GRANT AND GALE, 1931, p. 261; EYERDAM, 1938, Nautilus, vol. 51, no. 3, p. 101; BURCH, 1944, no. 38, p. 3; 1945, no. 45, p. 9; HERTLEIN AND STRONG, 1946, Zoologica, New York Zool. Soc., vol. 31, pt. 3, p. 97

Conrad's original description was republished by Oldroyd (1924b, p. 89) and Grant and Gale (1931, p. 261). Carpenter suggested that his species might be the same as *P. bilirata* Conrad.

The original description and illustration of the holotype of *P. bicarinata* Carpenter are included to assist in the verification of the synonymy of the species. The type of *P. bilirata* Conrad has been lost (A. A. Olsson and John D. Parker, May 10, 1950, personal communication). The type is not at the Academy of Natural Sciences, Philadelphia, Pennsylvania.

The synonymy and discussion of *P. bilirata* is not intended to be complete.

"K. t. 'K. filosa' simili, sed haud rostrata; postice latiore; carinis in valva convexa duabus, in valva planata una, ex umbonibus postice decurrentibus; lamina prismatica radiatim sulcata, haud spongiosa; valva convexa tenuiter indentata; ligamento elongato, tenuissimo. Long. .5, lat. .25, alt. .06 poll.

"*Hab.* in insula Catalina, Californiae; 40-60 uln., rara (*Dr. J. G. Cooper*. State Geological Survey Coll. No. 1063; Mus. Smithsonian Inst.).

"The shape and keels at once distinguish this beautiful little species from its Northern ally, with which, in the hinge and threading of the outer layer, it exactly agrees. The ligament in both species is extremely thin, holding the valves together from the umbo to the posterior end. The fossil *Pandora bilirata*, Conr., may prove identical with this recent species; but the diagnosis, figure, and type specimen are so imperfect that it would be too hazardous to affiliate them." [Carpenter, 1864c, p. 603]

*Holotype*.—*P. bilirata* Conrad, lost. *P. bicarinata*, U. S. National Museum, No. 592440 ("Cp. 1063"). The holotype consists of both valves on Carpenter's original glass mount with the original label, "Type Sta. Catalina Cooper."

*Distribution*.—Catalina Island (type, *P. bicarinata* Carpenter); "California" (type, *P. bilirata* Conrad); Drier Bay, Prince William Sound, Alaska, to Point Abrejos, Lower California (Eyerdam and Dall)

#### *Pandora* (*Pandorella*) *filosa* Carpenter

(Pl. 6, figs. 9-14)

- Kennerlia filosa* CARPENTER, 1864b, Aug., p. 602, 638; Reprint, 1872, p. 88, 124; 1864, Nov., Zool. Soc. London, Proc., p. 602; Reprint, 1872, p. 231; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 55
- Pandora filosa* Carpenter, SOWERBY, 1870, in REEVE, Conch. Icon., *Pandora*, vol. 19, pl. II, fig. 10a, 10b; PACKARD, 1918, Univ. California, Pub. Zool., vol. 14, no. 2, p. 261, pl. 19, figs. 2a, 2b
- Pandora* (*Kennerlia*) *filosa* Carpenter, 1869, Cat. Family Pandoridae, Acad. Nat. Sci. Philadelphia, p. 71; ARNOLD, 1903, June, p. 124, pl. XVIII, fig. 3
- Kennerlia filosa* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 4 ("adult of *bicarinata*?")
- Pandora* (*Kennerlyia*) *filosa* (Carpenter), DALL, 1903, Oct., Wagner Free Inst. Sci. Philadelphia, vol. III, pt. VI, p. 1517
- Pandora* (*Kennerlyia*) *filosa* (Carpenter), OLDROYD, 1924b, p. 88, pl. 33, figs. 2a, 2b same fig. as PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, pl. 19, figs. 2a, 2b
- Pandora* (*Kennerlia*) *filosa* Carpenter, DALL, 1921, p. 26; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 28, pl. 37, figs. 2a, 2b same fig. as PACKARD, 1918; GRANT AND GALE, 1931, p. 261; BURCH, 1944, no. 38, p. 3; 1945, no. 45, p. 9
- "*Kennerlia filosa*, n.s. and n. subg. Several living specimens." [Carpenter, 1864b, p. 602.]
- "*Kennerlia filosa*, n.s. New subgenus of *Pandora* with ossicle: outer layer radiately grooved. Shell beaked." [Carpenter, 1864b, p. 638]

The description (1864c Nov.) was copied by Oldroyd (1924b, p. 88), to which the following should be added to make her copy complete:

"... Long.—.8, lat. .4, alt. .12 poll.

*Hab.* in sinu Pugetiano (*Kennerley*)." [Carpenter, 1864c, Nov., p. 602]

The interior or shelly plate of the middle area of "*Kennerlia*" is attached to the central ligament in both valves. The portion of the splinter or ossicle may, therefore, when preserved be attached to the ligament of one or the other valve. In the type of "*P. bicarinata* Carpenter," it is preserved in the left valve; in one of the syntypes of *K. filosa* it is preserved in the right valve.

*Syntypes*.—U. S. National Museum, no. 4542. Consists of two double shells. The label reads, "Type. Puget Sound. Kennerley."

*Distribution*.—Recent. Puget Sound, Washington (type). Nunivak Island, Bering Sea to Todos Santos Bay, Lower California (Burch, 1945). See Table 2 for stratigraphic distribution.

#### Family CUSPIDARIIDAE

##### Genus *Cuspidaria* Nardo, 1840

(In part *Neaera* Griffith and Pidgeon, 1834, pl. 22, fig. 5, facing p. 420; not Robineau—Desvoidy, 1830, Diptera)

*Cuspidaria* NARDO, 1840, Ann. Sci. Regno Lombardo-Veneto, vol. X, p. 50; 1840, Rev. Zool., p. 30

Type species by original designation<sup>27</sup> *Cuspidaria typus* NARDO ms. = *Tellina cuspidata* OLIVI, 1792, Zool. Adriatico, p. 101, pl. 4, fig. 3. Living. Mediterranean

##### Subgenus *Cardiomya* A. Adams, 1864

*Cardiomya* A. ADAMS, 1864, March, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 208

Type species by monotypy, *Cardiomya gouldiana* (HINDS), 1843, Zool. Soc. London, Proc., p. 77 as *Neaera*. Living. New Guinea. Philippines. Japan. HINDS, 1844, Zool. Voy. Sulphur, v. 2, p. 70, pl. 20, fig. 17

##### *Cuspidaria* (*Cardiomya*) *pectinata* (Carpenter)

(Pl. 6, figs. 1–5)

*Neaera pectinata* CARPENTER, 1864b, Aug., p. 602, 637; Reprint, 1872, p. 88, 123; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 54; CONRAD, 1869, Cat. Family Anatinidae, Acad. Nat. Sci. Philadelphia, p. 57; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 4; ARNOLD, 1903, p. 181, pl. XVIII, fig. 11

*Cuspidaria pectinata* (Carpenter), DALL, 1921, p. 28 section *Cardiomya*; Oldroyd, 1924b, p. 101 section *Cardiomya*; Keen, 1937, p. 20

*Cuspidaria* (*Cardiomya*) *pectinata* (Carpenter), GRANT AND GALE, 1931, p. 265, pl. 1, figs. 16, 17; HERTLEIN AND STRONG, 1946, Zoologica, New York Zool. Soc., vol. 31, pt. 3, p. 101

*Cardiomya pectinata* (Carpenter), BURCH, 1944, no. 38, p. 13; 1945, no. 45, p. 10

"*Neaera pectinata*, n.s. One sp. living." [Carpenter, 1864b, p. 602]

"*Neaera pectinata*, n.s. Principal ribs about 12; beak smooth. Like *sulcata*. 40–60 fm. Cp." [Carpenter, 1864b, p. 637]

"N. t. globosa, albida, subdiaphana, epidermide tenui indutâ, ventraliter antice productâ; postice subito angustato, rostrato, rostro haud insculpto, duabus inter quinque partes totius longitudinis aequante; parte globosa acute costata; costis posticis paulum majoribus, magis distantibus; margines dorsales versus obsoletis; interstitiis latis, quadratis, minutissime concentricè striatis; costis principalibus t. jun. XII–XV, adulta, aliis crebre intercalantibus, circ. XXX., quarum primi majores; intus, lamina cartilaginea curta, subumbones celata; dente postico satis elongato, regione adductoris intus claviculato; cicatricibus adductoribus subrotundatis, deorsum sitis; sinu pallii parvo, lato; margine à costis pectinato. Long. .24, lat. .14, alt. .12.

"*Hab.*—In sinu Pugetiano specimen junior legit Kennerley. Apud insulam Catalinam et Sanct. Barbaram adultum piscavit Cooper." [Carpenter, 1865, p. 54]

The holotype consists of one double shell in the U. S. National Museum with the label "*Neaera pectinata*. Type. Puget Sound, W. T."

<sup>27</sup> Art. 30, b, Int. Rules Zool. Nomen.

Puget Sound is unquestionably the type locality. Dall overlooked this fact in 1921 although he had access to the holotype, for he limits the northern range of the species to Monterey. Oldroyd, in spite of stipulating Puget Sound as the type locality of *C. pectinata*, did not include the species in her monograph on the marine shells of Puget Sound. Grant and Gale (1931, p. 265) stated that Mrs. Oldroyd "dredged many specimens in ten to twelve fathoms in Puget Sound."

The specific rank of *C. californica* Dall (1886b, p. 296) and its relation to *C. pectinata* is still unsettled.

The variability of the number of the radiating ribs was originally brought out.

*Holotype*.—U. S. National Museum, no. 4506

*Distribution*.—Recent. Puget Sound, Washington (type); Puget Sound, Washington, British Columbia, to Panama Bay (Oldroyd), East of Cedros Island, 45 fathoms (Hertlein and Strong). See Table 2 for stratigraphic distribution.

#### Genus *Leiomya* A. Adams, 1864

*Leiomya* A. ADAMS, 1864, March, Ann. Mag., Nat. Hist., ser. 3, vol. XIII, p. 208.

Type species by monotypy, *Leiomya adunca* GOULD, 1861, Boston Soc. Nat. Hist., Proc., vol. VIII, p. 24; 1862, Otia, p. 162 as *Neaera*. Recent. Kayosima [Kagoshima], sandy mud, 12-15 fathoms (original), Tsu-Sima, 30 fathoms, Seto-Uchi, 7 fathoms, Hakodadi, 7 fathoms (Adams).

Tadashige Habe (Feb. 25, 1950, personal communication) informed the writer that specimens of this species have not been rediscovered. The Adams specimens are not in the British Museum (G. L. Wilkins, Mar. 14, 1950, personal communication).

#### Subgenus *Plectodon* Carpenter, 1864

*Plectodon* CARPENTER, 1864, Suppl. Rept. British Assoc. 1863, p. 638; Reprint, 1872, p. 124; 1866, California Acad. Sci., Proc., vol. III, p. 207; DALL, 1886, Mus. Comp. Zool., vol. XI, p. 299; DALL, 1903, Wagner Free Inst. Sci., Philadelphia Trans., vol. III, pt. VI, p. 1504

Type species by monotypy, *P. scaber* CARPENTER, 1866, California Acad. Sci., Proc., vol. III, p. 207. Recent Catalina Island to Lower California. Pl. 6, figs. 6-8; KEEN AND FRIZZELL, 1939, West North American Pelecypod Genera, p. 12, fig. 6

#### *Leiomya* (*Plectodon*) *scabra* Carpenter

(Pl. 6, fig. 6-8)

*Plectodon scaber* CARPENTER, 1864b, p. 611, 638; Reprint, 1872, p. 97, 124; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 207; CONRAD, 1869, Cat. Family Anatinidae, Acad. Nat. Sci. Philadelphia, p. 58; COOPER, 1867, Cat. Geog. Moll., Geol. Sur. California, p. 5; BURCH, 1944, no. 38, p. 14; BURCH, 1945, no. 45, p. 10; SCHENCK, 1945, Jour. Paleont., vol. 19, no. 5, p. 519, pl. 67, figs. 1-4 same specimen as KEEN AND FRIZZELL, 1939, p. 12, fig. 6

*Leiomya* (*Plectodon*) *scaber* (Carpenter), DALL, 1921, p. 29; OLDROYD, 1924b, p. 103, not pl. 54, fig. 4; 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 34; KEEN, 1937, p. 21; HERTLEIN AND STRONG, 1946, Zoologica, New York Zool. Soc., vol. 31, pt. 3, p. 101

"*Plectodon scaber*, n.g. and n.s. Cat. Is.; 2 similar valves, 40-60 fm." [Carpenter, 1864b, p. 611]

"*Plectodon scaber*, n.g., n.s. Shape of *Theora*: dorsal margins twisted-in spirally inside umbos. Lateral teeth laminated, with internal cartilage hidden, appressed. 2 r. valves, 40-60 fm. *Cp.*" [Carpenter, 1864, p. 638]

The description of this species (Carpenter, 1866a) was copied by Oldroyd and will not be repeated here except to complete the copy. The word "usque" should be included between "oblique" and "ad" in line four of the Oldroyd copy.

Add:

"*Hab.* Catalina Island, two right valves, 40-60 fms. *Cp.*

"This very distinct genus has the aspect of *Theora*, and appears allied to *Neaera*. It is probable that the cartilage was strengthened by an ossicle. The great peculiarity is the twisting-in of the dorsal margin, which ascends the umbo in a very loose spiral." [Carpenter, 1866a, p. 207, 208]

The holotype is broken. The external posterior area is encrusted with Bryozoa as are the dorsal and ventral margins of the interior. Carpenter originally had two right valves.

*Holotype*.—U. S. National Museum, 592441 (Cp. 1062). The specimen was on the original Carpenter glass mount with the original label "Type Cp. 1062 Plectodon scaber, *Cpr.* Catalina Is. Cooper." The number coincides with the original number of the State [California] Collection which adds to the authenticity as type.

*Distribution*.—Catalina Island, 40–60 fathoms (type); Catalina Island, California, to Santa Inez Bay, east coast of Lower California (Hertlein and Strong, 1946)

#### Family ASTARTIDAE

##### Genus *Astarte* Sowerby, 1816

*Astarte* SOWERBY, 1816, Mineral Conchology, vol. II, p. 85 for date see NEWTON 1891, p. 323; SMITH, E. A., 1881, Jour. Conch., vol. III, p. 196; DALL, 1921, U. S. Nat. Mus., Proc., vol. XXVI, no. 1342, p. 933–951.

Type species by original designation, *Venus scotica* MATON AND ROCKETT, 1807, Trans. Linn. Soc., vol. VIII, p. 81, pl. II, fig. 3 = *Astarte sulcata* (DA COSTA), 1778, British Conch., p. 192. It seems as though Sowerby's statement<sup>28</sup> as to the type of the genus is definite enough for a type designation. It is unnecessary to induce the designation of STOLICZKA, 1871 (GRANT AND GALE, 1931, p. 266). Recent. Nova Zembla, Norway, Great Britain to Spain. FISCHER, 1887, Man. de Conchyl., pl. XX, fig. 1; DAUTZENBERG AND FISCHER, 1912, Res. Campagnes Sci. Albert I Prince de Monaco, Moll., fasc. XXXVII, p. 412–416

##### *Astarte compacta* Carpenter

(Pl. 7, figs. 13–15A)

*Astarte compacta* CARPENTER, 1864b, p. 602, 642, 682; Reprint, 1872, p. 88, 128, 168; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 57 "? *compressa* var."; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 8; SMITH, E. A., 1881, Jour. Conch., vol. III, p. 203, 226; DALL, 1903, U. S. Nat. Mus., Proc., vol. 26, no. 1342, p. 944, pl. LXIII, fig. 8; 1917, Nautilus, vol. 31, no. 1, p. 10; 1921, p. 29; OLDROYD, 1924b, p. 104, pl. 2, fig. 4 same figs. as of DALL, 1903; 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 34, pl. 16, fig. 4 same figs. as in DALL, 1903, and OLDROYD, 1924; KEEN, 1937, p. 18; BURCH, 1944, no. 39, p. 6; 1945, no. 45, p. 10

"*Astarte compacta*, n.s. Like *compressa*, but closer; dorsal margins straight, at right angles." [Carpenter, 1864b, p. 642]

The original description (1865e) has been reprinted by Oldroyd. The additional line of the description should be added.

"*Hab.*—In sinu Pugetiano specimen unicum piscavit Kemmerley." [Carpenter, 1865e, p. 57]

Correct in Oldroyd: Following "Long.", read ".4" for ".56".

Dall stated in 1921 that the species was rare.

*Holotype*.—U. S. National Museum, no. 4509, one double specimen

*Distribution*.—Puget Sound, Washington (type); Forrester Island, Alaska, to Puget Sound, Washington (Dall)

#### Family CRASSATELLIDAE

##### Genus *Eurassatella* Iredale, 1924

*Eurassatella* IREDALE, 1924, Linn. Soc. New South Wales, Proc., vol. 49, p. 202

Type species by original designation, *Crassatellites kingicola* (Lamarck), "Ann. Mus. Hist. Nat. Paris, VI," (p. 408), LAMARCK, 1835, Hist. Nat. An. s. Vert., 2d ed., vol. VI, p. 109. Living. King Island, Bass Strait, South Australia. LAMY, 1917, Jour. de Conchyl., vol. LXII, p. 205, pl. VI, fig. 1; REEVE, 1846,<sup>29</sup> Conch. Icon., vol. 1, *Crassatella*, pl. 1, fig. 5

<sup>28</sup> "... are Venus Scotia, (which may be taken for the type of the Genus) ..." (Sowerby, 1816, p. 85)

<sup>29</sup> No date on pages. Date taken from last dated previous page.

*Eucrassatella fluctuata* (Carpenter)

(Pl. 7, figs. 5-7)

- Astarte fluctuata* CARPENTER, 1864b, p. 611, 642; Reprint, 1872, p. 97, 128; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 209; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 8; TRYON, 1872, Acad. Nat. Sci. Philadelphia, Proc., vol. 24, p. 246; SMITH, 1881, Jour. Conch., vol. III, p. 231
- Crassatellites fluctuatus* (Carpenter), DALL, 1921, p. 31; OLDROYD, 1924b, 109; KEEN, 1937, p. 20
- Crassatella fluctuata* (Carpenter), BURCH, 1944, no. 39, p. 8; 1945, no. 45, p. 11
- Eucrassatella fluctuata* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Nat. Mus., Prof. Paper 207, p. 81, pl. 31, figs. 1-8
- "? *Astarte fluctuata*, n.s. Cat. Is.; 2 similar valves; 40 fm. (Very like the Crag fossil, *A. amaria*, jun.; but Dr. Cooper considers it a *Crassatella*.)" [Carpenter, 1864b, p. 611]
- "? *Astarte fluctuata*, n.s. Very close to *Omalii*, jun. of Coralline Crag. 2 right v. 30-40 fm. *Cp.*" [Carpenter, 1864b, p. 642]

Oldroyd reprinted the major portion of the original description. The following original lines should be added to complete her copy :

"Long. 0.33, lat. 0.26, 0.10.

"*Hab.* Catalina Island, 30-40 fm. *Cooper.*

"Only dead right valves having been found, it is not known whether this species be an *Astarte* (according to Messrs. Adams and Hanley) or an abnormal *Crassatella*. It scarcely differs from the young of *Astarte omalia*, from the Coralline Crag." [Carpenter, 1866a, p. 209]

The holotype is mounted on the original glass with label by Carpenter in white ink "fluctuata, Cpr. Cp. 1060 Catalina Is. (Cooper), type 'Cooper'."

*Holotype*.—U. S. National Museum, No. 1060 (California State Collection, No. 1060)

*Distribution*.—Recent. Catalina Island, California, 30-40 fathoms (type); Santa Barbara Islands, to San Pedro, California (Burch). Lower Pleistocene. California (Woodring, Bramlette, and Kew)

*Crassatella marginata* Carpenter

- "*Crassatella marginata* Cpr. Californ." PAETAL, 1890, Calatoguder Conchilien-Sammlung, pt. 3, p. 139 *vide* LAMY, 1917; ORCUTT, 1915, Molluscan World, p. 13, 60
- ? *Crassatellites marginata* "Cpr.", KEEP, 1887, West Coast Shells, p. 179; LAMY, 1917, Jour. de Conchyl., vol. LXII, p. 204 footnote

The name *Crassatella marginata* Carpenter is a *nomen nudum*. Therefore, it is difficult to determine just what the various authors meant unless they followed Keep. See Burch (1944, no. 39, p. 9) for notes on the name. The writer separates the references in Keep as the foundation of a valid specific name with Keep as the author. The test will be if there is a species of *Crassatella* in the California fauna which needs this berth. Keep and others must have had some specimen to which they were applying Carpenter's ms. name.

*Crassatella marginata* Keep

*Crassatella marginata* "Cpr.", KEEP, 1887, West Coast Shells, p. 179

? *Crassatellites margarita* Carpenter, JORDAN, 1924, So. California Acad. Sci., Bull., vol. XXIII, pt. 5, p. 153 probable error for "marginata"

*Crassatellites marginata* "Carpenter," KELSEY, 1905, San Diego Soc. Nat. Hist., Trans., vol. 1, no. 2, p. 38; BAILY, 1935, West Coast Shells (Keep), p. 73

Keep published a brief description adequate to validate the specific name if specimens are available to determine what Keep had in mind. The specific name must be credited to Keep and not to Carpenter. A type should come from specimens which Keep used at the time of his edition of 1887, but apparently those are not available. According to Mr. Joshua Baily (March 9, 1950, personal communication) they may turn up in the Baker-Kelsey Collection at the Scripps Institute of Oceanography at La Jolla.

## Family CARDITIDAE

Genus *Glans* Mergerle von Mühlfeld, 1811

(Cardita Bruguière, 1792, in part)

*Glans* MERGERLE VON MÜHLFELD, 1811, Gesell. Natur. Freunde Berlin, Mag., year 5, p. 68  
 Type species by monotypy *Glans trapezia* (LINNAEUS), 1767, Syst. Nat., 12 ed., p. 1138 as  
*Chama*; Recent. Mediterranean. BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1892, Moll.  
 Marins du Rousillon, vol. 2, pl. 38, figs. 21-25; COSSMANN AND PEYROT, 1912, Act. Soc.  
 Linn. Bordeaux, vol. LXVI, Conch. Neog. de l'Aquitaine, t. II, liv. 1, p. 31, fig. hinge

*Glans subquadrata* (Carpenter)

(Pl. 7, figs. 1-4)

*Lazarina subquadrata* CARPENTER, 1864b, p. 536, 627, 642; Reprint, 1872, p. 22, 113, 128; 1865,  
 Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 178; Reprint, 1872, p. 280; COOPER, 1867, Geog.  
 Cat. Moll., Geol. Sur. California, p. 9; KEEP, 1887, 1892 West Coast Shells, p. 179, fig.  
 152; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 190; ARNOLD, 1903, p. 129

*Cardita (Carditamera) subquadrata* (Carpenter), ORCUTT, 1886, U. S. Nat. Mus., Proc., vol.  
 8, p. 549; DALL, 1903 (page date 1902), Acad. Nat. Sci. Philadelphia, Proc., vol. 54, pt.  
 4, p. 707

*Cardita subquadrata* (Carpenter), DALL, 1921, p. 31 section *Carditamera*; OLDROYD, 1924,  
 Pub. Puget Sound Biol. Station, vol. 4, p. 35. Not *C. subquadrata* CONRAD, 1847, Acad.  
 Nat. Sci. Philadelphia, Proc., vol. 3, p. 298 or GABB, 1860, Acad., Nat. Sci. Philadelphia,  
 Jour. ser. 2, p. 303; OLDROYD, 1924b, p. 110

*Cardita (Carditamera) Carpenteri* LAMY, 1922, Jour. de Conchyl., vol. LXVI, p. 264, new  
 name

*Glans (Glans) carpenteri* (Lamy) KEEN, 1937, p. 21; BURCH, 1944, no. 39, p. 11; 1945, no.  
 45, p. 11

*Glans minuscula* GRANT AND GALE, 1931, p. 277, new name, see also for additional synonymy;  
 BAILY, 1935, West Coast Shells (Keep), p. 73, fig. 39

*Glans subquadrata* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur.,  
 Prof. Paper 207, p. 82

Since the original name given by Carpenter was *Lazarina subquadrata*, the new name *car-*  
*penteri* is not necessary unless the *Cardita subquadrata* Conrad (1847, p. 298) or *Cardita sub-*  
*quadrata* Gabb, 1860, p. 303 = *C. perantiquata* Conrad (1865, p. 8) is placed in *Glans* or  
 "L." *subquadrata* Carpenter is defined as *Cardita*. In that case Lamy's name is available.  
*Glans minuscula* Grant and Gale (1931) is superfluous.

"*Lazarina subquadrata*, n.s. Hinge of *Lazarina*: outside like *Cardita variegata*, jun." [Car-  
 penter, 1864b, p. 642]

The copy of the description of 1865 and translation has been given by Oldroyd. The fol-  
 lowing original lines make the copy complete:

"Hab. Sta. Barbara (*Jewett*); Monterey, and along the coast to S. Pedro (State Coll.  
 no. 403) (*Cooper*).

"The outside of this remarkable little species is typically carditoid; the hinge is interme-  
 diate between *Lazarina* and *Cypricardia*." [Carpenter, 1865a, p. 178]

Correct in Oldroyd (1924b): "Lat., .23" to read "lat., .25"

The types in the U. S. Nat. Museum consist of two double valves. The label states, "Type  
 Monterey Cooper cp. 403." Such notes identify the specimens as the second locality listed in  
 the original description (see above), and, therefore, limits the type locality to Monterey. The  
 type locality of Santa Barbara as given by Oldroyd (copied by Burch, 1944) would pertain  
 to the Jewett specimen, which is not consistent with the first part of Oldroyd's note in regard  
 to the type. The California State Collection, no. 403, refers to Cooper's specimen from Mon-  
 terey, California. Since the first-mentioned specimens, Santa Barbara, are not to be found,  
 and the Monterey types are, circumstances settle the matter of the election of a type locality.

On the type label there is also marked "Type Neeah Bay J. G. Swann." This notation  
 may refer to the specimen which Carpenter listed (1864b, p. 627). The label has been crossed  
 off, indicating that it does not belong to the present specimen in the box. The number "Cp.  
 403" is also numbered 15551, 14783, 16233, stipulating U. S. Nat. Museum equivalent num-  
 bers. The Cp. 403 refers to Monterey, with no mention of Santa Barbara.



The types have a well-impressed humule and escutcheon. There are a posterior and an anterior lateral in the right valve and a central and posterior cardinal.

*Syntypes*.—U. S. National Museum, No. 15681 ("California State Coll. 403")

*Distribution*.—Recent. Monterey, California (type); Queen Charlotte Islands to Todos Santos Bay, Lower California (Dall). Pleistocene. California (Grant and Gale, 1931; Arnold, 1903; Chace and Chace, 1919) Mexico (Jordan, 1926). Pliocene (Woodring and Bramlette, 1950)

#### Genus *Miodontiscus* Dall, 1903

*Miodon* CARPENTER, 1864b, Aug., p. 611, 627, 642; Reprint, 1872, p. 97, 113, 128; 1864d, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 424; Reprint, 1872, p. 236; DALL, 1903 (page date 1902), Acad. Nat. Sci. Philadelphia, Proc., vol. 54, pt. 4, p. 700, 711. Not *Miodon* DUMÉRIE, 1859, or *Miodon* SANDBERGER, 1871 (see NEAVE, 1939-40)

*Miodontiscus* DALL, 1903, April, Nautilus, vol. 16, no. 12, p. 143; 1903, Oct., Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. VI, p. 1417, substitute name for *Miodon* CARPENTER; CHAVAN, 1937, C.R.S. Soc. Géol. France, no. 10, p. 122

Type species by original designation<sup>30</sup> *M. prolongatus* CARPENTER (1864b, p. 627). Recent. West Coast United States, Alaska, to San Diego, California (Pl. 8, figs. 1-7)

#### *Miodontiscus prolongatus* (Carpenter)

(Pl. 8, figs. 1-7)

*Miodon prolongatus* CARPENTER, 1864b, Aug., p. 611, 627, 642, 682; Reprint, 1872, p. 97, 113, 128, 168; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 424; Reprint, 1872, p. 236; COOPER, 1867, Geog. Cat. Geol. Sur. California, p. 9; STEARNS, 1891, U. S. Nat. Mus., Proc., vol. 13, p. 217, pl. 16, figs. 7, 9 hinge of fig. 7 not accurate

*Venericardia* (*Miodon*) *prolongatus* (Carpenter), DALL, 1903 (page date 1902), Acad. Nat. Sci. Philadelphia, Proc., vol. 54, pt. 4, p. 700, 711

*Venericardia* (*Miodontiscus*) *prolongatus* (Carpenter), DALL, 1921, p. 32; OLDROYD, 1924b, p. 115, pl. 2, figs. 5, 6; 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 36, pl. 16, figs. 5, 6

*Cardita* (*Miodontiscus*) *prolongata* (Carpenter), GRANT AND GALE, 1931, p. 276

*Cardita prolongata* Carpenter, KEEN, 1937, p. 19; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 172

*Miodontiscus prolongatus* (Carpenter), CHAVAN, 1937, C.R.S. Soc. Geol. France, no. 10, p. 122; BURCH, 1944, no. 39, p. 17; 1945, no. 45, p. 11

"*Miodon prolongatus*. (Neeah Bay, Swan.) Identified from tracing only." [Carpenter, 1864b, p. 611]

"*Miodon prolongatus*, n. subg., n.s. Several valves of this curious shell, intermediate between *Lucina* and *Venericardia*, accord with forms not before eliminated, from the Coralline Crag and Inferior Oolite." [Carpenter, 1864b, p. 627]

"*Miodon prolongatus*, n.g., n.s. Outside Lucinoid; hinge and scars nearer to *Venericardia*. Congeneric with *Astarte orbicularis*, J. Sby. Min. Conch. pl. 444. f. 2, 3 (non ejusdem, pl. 520, f. 2). G. Oolite; and with the Crag *Cardita corbis*." [Carpenter, 1864b, p. 642]

A copy of the description (Carpenter, 1864d) has been published by Oldroyd. The following should be added to complete that copy: "Long. .23, lat. .24, alt. .16."

Four specimens at the Redpath Museum are labelled "type" in Carpenter's handwriting, and they are on Carpenter's original mount. There are also five specimens in the U. S. National Museum, no. 15472<sup>31</sup>, also labelled "type" by Carpenter. Both suites have the label "Neeah Bay Swan." The writer retains all the types as syntypes and therefore leaves a lectotype designation open in case the species is later thoroughly studied. It may then seem desir-

<sup>30</sup> The writer considers the use of "n. subg. n.s." (Carpenter, 1864b, p. 627) as an original designation of type species (Opin. 7, Int. Rules Zool. Nomen.) rather than the type designated by monotypy, since Carpenter did bring into his discussion a second species. Either method of type designation produces in this case the same type species for the genus.

<sup>31</sup> Stearns, (1891, p. 217) meant this number, but the figures were transposed in printing to 15742.

able to have one specimen as a lectotype, and by such study the most fitting specimen can be designated.

*Syntypes*.—U. S. National Museum, no. 15472; Redpath Museum, no. 2377

*Distribution*.—Recent. Neah Bay, Washington (type); Middleton, Alaska, to San Diego, California (Dall). Pleistocene (see Grant and Gale, 1931; Woodring, Bramlette, and Kew, 1946.)

Genus *Axinopsida* Keen and Chavan in Chavan, 1951

(= *Axinopsis* G. O. Sars, 1878, Moll. reg. Arct. Norvegiae, p. 63)

*Axinopsida* KEEN AND CHAVAN in CHAVAN, 1951, Comp. rend. Somm., Soc. Geol. France, no. 12, p. 211, new name for *Axinopsis* Sars, 1878, Moll. reg. Arct. Norvegiae, p. 63

Type species by monotypy and original designation, *Axinopsis orbiculata* Sars, 1878, Moll. reg. Arct. Norvegiae, p. 63. Recent. North Atlantic to Maine. Sars, 1878, Moll. reg. Arct. Norvegiae, pl. 19, fig. 11 a-d; BUSH, 1883, U. S. Nat. Mus., Proc., vol. VI, pl. IX, fig. 4

*Axinopsis* Sars is preoccupied by *Axinopsis* Tate (1868, see Neave, 1939-40) new name for *Schizodus* King (1844, see Neave, 1939-1940)

*Axinopsida serricata* (Carpenter)

(Pl. 7, figs. 16-18)

*Cryptodon serricatus* CARPENTER, 1864b, p. 602, 643 *serricatus*; Reprint, 1872, p. 88, 129; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 9 *serricatus*

*Axinopsis sericatus*<sup>32</sup> (Carpenter), DALL, 1901, U. S. Nat. Mus., Proc., vol. 23, n. 1237, p. 791, 819, pl. XL, fig. 2; DALL, 1921, p. 34; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 38, pl. 26, fig. 4; OLDROYD, 1924b, p. 123, pl. 4, fig. 4; BURCH, 1944, no. 39, p. 22; 1945, no. 45, p. 12

*Axinopsis sericatus* KEEN, 1937, p. 18

"*Cryptodon serricatus*, n.s. One living sp." [Carpenter, 1864b, p. 602. Puget Sound, Dr. Kennerley]

"*Cryptodon serricatus*, n.s. Small circular, flat; epidermis silken. ? Cat. Is. *Cp.* 120 fm." [Carpenter, 1864b, p. 643]

There is some question as to the true type of this species. The first specimen which Carpenter noted (1864b, p. 602) was a specimen collected by Dr. Kennerley from Puget Sound. There is a question whether that shell is the one now labelled type in the U. S. National Museum (no. 5249) and figured by Dall (1901b). That specimen is labelled, "Dr. Kennerley [*sic*] Puget Sound." There are, however, in the Redpath Museum, two broken specimens labelled "type. Dr. Kennerley [*sic*] Puget Sound."

Carpenter did not give a complete description of this form, but with the few descriptive words by Carpenter (see above) the locality is stated to be "? Catalina Island."

The Puget Sound specimens are not the primary types, but the questionable Catalina Island specimen noted by Carpenter has not been found. The first locality mentioned (1864b, p. 602) in connection with the specific name was Puget Sound. Therefore, it would seem logical to designate as the lectotype a specimen which had been labelled by Carpenter and collected from Puget Sound by the original discoverer, Dr. Kennerley. In the first mention of the species, Carpenter wrote, "one living sp." Hence, there would be a question as to which is the authentic original shell, one of those of the U. S. National Museum or of the Redpath Museum. Since the Redpath Museum specimens are broken, the writer designates the specimen figured by Dall (1901), U. S. National Museum, no. 5249, as the lectotype of the species. There are three specimens under no. 5249. Dall (1901b explanation of pl. XL, fig. 2) refers to the specimen as the type.

<sup>32</sup>*Opsis*, Greek, feminine gender. Following Dall, this specific name has been incorrectly written in the masculine when written with *Axinopsis*. Probably Carpenter when he stated "epidermis silken" and named the species *serricatus* [*sic*] meant the Latin word *sericatus* ("clothed in silken garments"). Hence, the original spelling of the specific name could be considered a *lapsus* and the name be corrected to *sericatus* as Dall did in 1921. The reasoning opposed to this change is that Carpenter consistently spelled the specific name with two r's, and Carpenter was also a Latin student.

Burch (1944, no. 39, p. 22) was justified in being puzzled over the differences, if any, between *A. serricata* and *A. viridis*. Dall distinguished *A. viridis* as "orbicular" (1901b, p. 791) and *A. serricata* as "ovate." However, Carpenter defined *A. serricata* as "circular," which would confine his species in the realm of what Dall later called *A. viridis*. The lectotype of *A. serricata* has about the same height as length, 4.5 mm. to 4 mm. Specimens in collections identified as both or either species have the oblique form.

The two broken specimens in the Redpath Museum labelled "type" are white, smooth, greenish, and lighter in the center. The U. S. National Museum shell marked "type" is white and chalky. Either the McGill shells represent what Dall named *A. viridis*, or the color difference is not specific.

*Lectotype*.—U. S. National Museum, no. 5249 (Dall, 1901b, pl. XL, fig. 2). Three specimens of same number, including the lectotype, are labelled "type" in the U. S. National Museum; two broken specimens labelled "type" are in the Redpath Museum.

*Distribution*.—Puget Sound, Washington (type). Aleutian Islands, south and east to Puget Sound, Washington, and Catalina Island, California (Dall)

Family DIPLodontidae

Genus *Taras* Risso, 1826

(*Diplodonta* Bronn, 1831)

*Taras* Risso, 1826, Hist. Nat. Europ. Merid., vol. 4, p. 344

Type species by monotypy, *T. antiquatus* Risso, 1826, Hist. Nat. Europ. Merid., vol. 4, fig. 167. Pliocene-Pleistocene. Trinité

Chavan (1952, p. 121) discussed the *Taras-Diplodonta* problem in detail and believed that the type species of *Taras* should be rejected as a *nomen dubium*. Such a decision by the International Commission on Zoological Nomenclature would restore *Diplodonta* to usage.

*Taras subquadratus* (Carpenter)

*Diplodonta subquadrata* CARPENTER, 1856, Zool. Soc. London, Proc., 1855, pt. XXIII, p. 230; Dall, 1921, p. 34

*Taras subquadratus* (Carpenter), BURCH, 1944, no. 39, p. 24; 1944, no. 41, p. 20; 1945, no. 45, p. 12; HERTLEIN AND STRONG, 1947, Zoologica, New York Zool. Soc., vol. 31, pt. 4, p. 130; DURHAM, 1950, Geol. Soc. Amer., Mem. 43, pt. II, p. 78, pl. 19, fig. 4, 14

This species was described from Mazatlan, and although the write up was not in the Mazatlan Catalogue, the illustration of the holotype would properly belong as a supplement to that work. The synonymy is not meant to be complete.

Dall listed the species from Catalina Island. Burch (1945) gave the range from Santa Monica, California, to Panama, but Hertlein and Strong limited the specific range to San Ignacio Lagoon, Lower California, to Gorgona Island, Colombia, and the Galápagos. Durham (1950) reported the species from the upper Pliocene and Pleistocene of Lower California.

Family LUCINIDAE

Genus *Lucina* Bruguière, 1797<sup>33</sup>

*Lucina* BRUGUIÈRE, 1797, Encyl. Method., Tabl. Vers, pls. 284, 285, 286. For dates see Sherborn and Woodward, 1906, Ann. Mag. Nat. Hist., ser. 7, vol. XVII, p. 579

Type species by subsequent designation by GRAY, 1847, Zool. Soc. London, Proc., p. 195: *Venus jamaicensis* [Spengler] CHEMNITZ, 1784, Conch. Cab., vol. 7, p. 24, pl. 39, figs. 408, 409. Living. West Indies. REEVE, 1850, Conch. Icon., *Lucina*, vol. 6, pl. II, fig. 7a, 7b

Stewart (1930) and Chavan (1937) presented a detailed discussion of the problem of the nomenclature of *Lucina*. Chavan monographed the family (1937-1938, VI pts.). He used

<sup>33</sup>Bruguière names which would otherwise be *nomina nuda* (see Dodge, 1947a, p. 487; 1947b, p. 136; 1950, p. 68) are validated by the recommendation of the Int. Com. Zool. Nomen., agreed by Int. Cong. Zool., Paris, 1948, that generic names published prior to January, 1931, on a legend of plate without explanatory matter is to be treated as an "indication." (Bull. Zool. Nomen., vol. 4, pts. 10-12, 1950, p. 255.)

*Lucina* Lamarck (1801) with *Lucina jamaicensis* Spengler (*in* Chemnitz) as the type species. In 1952, he further analyzed the discrepancies in type designations for *Lucina* Bruguière and reaffirmed the type designation of Gray (1847). To settle the nonconformity in the use of the type species of *Lucina* the validation of the type species should be established by the International Commission on Zoological Nomenclature.

#### Subgenus *Here* Gabb, 1866

*Here* GABB, 1866, Geol. Sur. California, Paleontology, vol. II, sect. 1, pt. 1, p. 28  
Type species by subsequent designation, STOLICZKA, 1871, Pal. Indica, p. 251 *Lucina* (*Here*) *richthofeni* GABB, 1866, Pal. Geol. Sur. California, vol. II, p. 29 = *L. excavata* CARPENTER, 1857a. Living. San Pedro, California, to Mazatlan, Mexico. Miocene = Recent, California. DALL, 1901, U. S. Nat. Mus., Proc., vol. 23, p. 810, 827, pl. 40, figs. 7, 9; CHAVAN, 1937, Jour. de Conchyl., vol. 81, p. 203, fig. 3, hinge

#### *Lucina* (*Here*) *excavata* Carpenter

*Lucina excavata* CARPENTER, 1857, Cat. Mazatlan Moll., p. 98  
*Lucina* (*Here*) *Richthofeni* GABB, 1866, Geol. Sur. California, Paleontology, vol. II, sect. 1, p. 29, pl. 8, fig. 49, a, b  
*Lucina* (*Here*) *excavata* Carpenter, HERTLEIN, and STRONG, 1946, Zoologica, New York Zool. Soc., vol. 31, pt. 3, p. 113

For complete synonymy see Stewart (1930, p. 181) and Grant and Gale (1931, p. 290)

This species was described from Mazatlan by Carpenter and is now identified as ranging as far north as San Pedro, California. The form is not illustrated herein because it properly belongs with the illustration of the Mazatlan Catalogue. The holotype should be in the British Museum (Natural History). The range of the species is stated under the subgenus.

#### Subgenus *Parvilucina* Dall, 1901

*Parvilucina* DALL, 1901, U. S. Nat. Mus., Proc., vol. 23, no. 1237, p. 806; DALL, 1903, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. VI, p. 1362  
Type species by original designation, *Lucina tenuisculpta* CARPENTER, 1864, Suppl. Rept. Brit. Assoc. 1863, p. 602, 611, 642; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 57. Recent. Bering Sea to Lower California (pl. 8, fig. 8-12)

#### *Lucina* (*Parvilucina*) *tenuisculpta* (Carpenter)

(Pl. 8, figs. 8-12)

*Lucina tenuisculpta* CARPENTER, 1864b, p. 602, 611, 642; Reprint, 1872, p. 88, 97, 128; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 57; COOPER, 1867, Geol. Cat. Moll., Geol. Sur. California, p. 9; 1888, 7th Ann. Rept. California State Min. Bur., p. 247; ARNOLD, 1903, p. 133; KEEN, 1937, p. 21  
*Phacoides* (*Parvilucina*) *tenuisculpta* (Carpenter), DALL, 1901, U. S. Nat. Mus., Proc., vol. 23, no. 1237, p. 806, 828, pl. XL, fig. 5; DALL, 1921, p. 35; DALL, 1915, U. S. Nat. Mus., Proc., vol. 66, no. 2554, p. 23, pl. 20, fig. 5; OLDROYD, 1924, Publ. Puget Sound Biol. Station, vol. 4, p. 39, pl. 3, fig. 14; pl. 37, figs. 1a, 1b; 1924b, p. 128, pl. 15, fig. 6; pl. 33, figs. 1a, 1b  
*Phacoides tenuisculptus* (Carpenter), PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 264, pl. 19, figs. 1a, 1b  
*Lucina* (*Myrtea*) *tenuisculpta* (Carpenter), GRANT AND GALE, 1931, p. 288, section *Parvilucina*, see for additional synonymy.  
*Lucina* (*Parvilucina*) *tenuisculpta* (Carpenter), BURCH, 1944, no. 40, p. 8; 1945, no. 45, p. 12; ABBOTT, 1954, p. 387, fig. 78h

"*Lucina tenuisculpta*, n.s. Two living specimens, of which one had the surface disintegrated." [Carpenter, 1864b, p. 602, Vancouver district]

"*Lucina tenuisculpta*, S. Diego, living in 4 fm. (also Puget Sound, *Kennerley*.) Var., dead in 120 fm. Cat. Is. (approaching *L. Mazatlanica*, Maz. Cat., no. 144)." [Carpenter, 1864b, p. 611]

"*Lucina tenuisculpta*, n.s. Like *Mazatlantica*, Cat. 144, more convex, with finer sculpture. 4 fm. living, *Cp.* The island var. is intermediate. 120 fm. dead. *Cp.*" [Carpenter, 1864b, p. 642]  
"L. t. '*L. Mazatlanica*' formâ simili; sed magis convexâ sculpturâ multo tenuiore; epideinde olivaceo-cinerea inductâ; t. juniore laevi; postea, rugis incrementi concentricis, plus minusve conspicuis, distantibus, irregularibus; costulis radiantibus subobsoletis, latis, cre-

brioribus, antice et postice evanidis; area postica vix subquadrata, haud definita: intus, dentibus cardinalibus et lateralibus normalibus, satis exstantibus; ligamento externo, elongato; cicatrice antica normaliter prolongata; margine crenulato. Long. .23, lat. .21, alt. .13.

"*Hab.*—In sinu Pugetiano legit Kennerley." [Carpenter, 1865e, p. 57]

Apparently Dall overlooked Carpenter's description (1865e) as Oldroyd also did in following Dall.

*Holotype*.—U. S. National Museum, no. 5244.

*Distribution*.—Recent. Vancouver Island, B. C. (Kennerley) (type); Nunivak Island, Bering Sea to the Coronado Island, California (Dall). Pleistocene and Pliocene (Grant and Gale, 1931)

Family LEPTONIDAE

Genus *Kellia* Turton, 1822

(*Chironia* Deshayes, Rev. Zool, 1839, v. 2, p. 357)

*Kellia* TURTON, 1822, Conchylia Insularum Britannicarum, p. 56

Type species by subsequent designation, RECLUZ<sup>34</sup>, Rev. Zool. Cuv., vol. 7, 1844, p. 295.

*Kellia suborbicularis* (MONTAGU), 1803, Test. Brit., p. 39; 1808, pl. 26, fig. 6. Recent. Norway to the Mediterranean. TURTON, 1822, Conch. Ins. Brit., p. 56, pl. 11, figs. 5, 6; FORBES AND HANLEY, 1848, Hist. Brit. Moll., vol. 1, pl. XVIII, figs. 9, 9a, 9b; HOWARD, 1953, p. 237, 238, figs. 2, 3

Carpenter (1864b, p. 643) identified West Coast specimens with this European species as well as specimens of West Coast *Lasaca* (Carpenter, 1864b, p. 643) with the European *L. rubra*. Authors have followed Carpenter until recent writings. (Burch, 1944, no. 40, p. 14). Keen (1938, p. 25) separated the West Coast forms from the European.

*Kellia laperousii*<sup>35</sup> *chironii* Carpenter

(Pl. 9, figs. 6-10)

*Kellia* var. *Chironii* Carpenter, 1864, p. 611, 627, 643; Reprint, p. 97, 113, 129; Dall, 1899, U. S. Nat. Mus., Proc., vol. XXI, p. 880

*Kellia* (*Laperousii*, var.) *Chironii* Carpenter, 1865, Jour. de Conchyl., vol. 13, ser. 3, vol. 5, p. 136; Reprint, 1872, p. 304; Gabb, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 9; Tryon, 1872, Acad. Nat. Sci. Philadelphia, Proc., vol. 24, p. 231; Keen in Burch, 1944, no. 40, p. 14

"*Kellia* (var.) *Chironii*. S. Diego. (Also Neeah Bay, *Swan*)." [Carpenter, 1864b, p. 611]

"*Kellia* (var.) *Chironii*. A few valves." [Carpenter, 1864b, p. 627]

"*Kellia* var. *Chironii*. Thinner, less transverse, margins rounded [Than *K. laperousii* Deshayes.]" [Carpenter, 1864b, p. 643]

"K.t. '*K. Laperousii*' simili; sed tenuiore, minus transversa, ventraliter excurvata; epidermide pallidior; umbonibus angustioribus; dentibus multo minoribus, haud exstantibus. Long. .76, lat. .62, alt. .41 poll. *Hab.* Neeah Bay, *Swan*; San Pedro, *Cooper*."

"Cette variété est assez distincte de la forme typique du *K. Laperousii*; mais la suite d'individus que j'ai eu occasion d'examiner comparativement m'a permis de me convaincre que l'espèce variat beaucoup." [Carpenter, 1865g, p. 136]

There are three syntypes in the United States National Museum from "Neeah Bay, J. G. Swann." They are presumably the specimens mentioned by Carpenter in his description (1865g) first. They are figured herein to give original evidence in the determination of the relationship of *Kellia laperousii* and the so-called "*K. suborbicularis* Montagu."

There is one good double specimen at the Museum of Comparative Zoölogy labelled "Coll. J. G. Cooper 144 San Francisco."

*Syntypes*.—U. S. National Museum, no. 15460 (three specimens)

*Distribution*.—Neeah Bay, Washington (type); San Diego, California (Carpenter); San Francisco, California (Cooper); common (Burch)

*Kellia rotundata* Carpenter

*Kellia rotundata* CARPENTER, 1864, p. 643; Reprint, 1872, p. 129; 1865, Jour. Conchyl., vol. XIII, ser. 3, vol. V, p. 137; Reprint, 1872, p. 305; COOPER, 1867, Geog. Cat. Moll., Geog.

<sup>34</sup>Winckworth (1934, p. 52)

<sup>35</sup>Deshayes, 1839 [1840], p. 357

Sur. California, p. 9; DALL, 1899, U. S. Nat. Mus., Proc., vol. 21, p. 880, synonymous with *K. laperousii* Deshayes; KEEN in BURCH, 1944, no. 40, p. 14

"*Kellia rotundata*, n.s. Larger, flatter, and less pearly than *suborbicularis*. Margins circular." [Carpenter, 1864b, p. 643.]

"*K. T. tenuissima*, orbiculari, satis convexa, aequilaterali, laevi, epidermide subnitente, pallide olivacea; umbonibus augustis, satis prominentibus; marginibus omnino regulariter excurvatis: intus, dentibus cardinalibus 2 tenuibus satis conspicuis, clavicula haud exstante; dentibus lateralibus satis elongatis.—Long. .6, lat., .5, alt. .28, poll.

Hab. Monterey, Taylor.

"Cette espèce est beaucoup plus grande, mais moins renflée que le *K. suborbicularis*, et se distingue facilement par sa forme presque complètement arrondie." [Carpenter, 1865g, p. 137]

The type of this form has not been found. In the analysis of the West Coast *Kellias* this species must be considered and as suggested by Keen the name is available if it is needed.

### Genus *Mysella* Angas, 1877

(*Rochefortia* Velain,<sup>36</sup> 1877, not earlier than Nov.)

*Mysella* ANGAS, 1877, Zool. Soc. London, Proc., Aug., p. 176

Type species by monotypy *M. anomala* ANGAS, 1877, Zool. Soc. London, Proc., pl. XXVI, fig. 22. Living. Australia

### *Mysella tumida* (Carpenter)

(Pl. 7, figs. 8–12)

*Tellimya tumida* CARPENTER, 1864b, Aug., p. 602, 611, 643; Reprint, 1872, p. 88, 97, 129; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 58; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 10; TRYON, 1872, Acad. Nat. Sci. Philadelphia, Proc., vol. 24, p. 229

*Mysella tumida* (Carpenter), DALL, 1899, U. S. Nat. Mus., Proc., vol. 21, no. 1177, p. 881, 892, pl. LXXXVII, fig. 7 type; ABBOTT, 1954, p. 397, fig. 80b same fig. as DALL, 1899

*Rochefortia tumida* (Carpenter), DALL, 1921, p. 37; OLDROYD, 1924, p. 132, pl. 54, figs. 11–14; 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 40; GRANT AND GALE, 1931, p. 301, pl. 14, figs. 16, 17; KEEN, 1937, p. 25; BURCH, 1944, no. 40, p. 15; no. 41, p. 20; BURCH, 1945, no. 45, p. 13

"*Tellimya tumida*, n.s. One sp. living." [Carpenter, 1864b, p. 602, Vancouver district.]

"*Tellimya tumida*, S. Diego. (Also Puget Sound, Kennerley)." [Carpenter, 1864b, p. 611]

"*Tellimya tumida*, n.s. Between *bidentata* and *striata*: ossicle minute." [Carpenter, 1864b, p. 643]

"*T. t. subtriangulari*, subovata, laevi solidiore, tumidior, valde inaequilaterali; cinerea epidermide pallide olivacea, concentric striata induta; marginibus dorsalibus, subrectis, ventrali excurvato: intus, dentibus cardinalibus valva sinistra validissimis, curtis extantibus, postico longiore, valve dextra callositatibus marginalibus, dentibus nullis; cartilagine validiore, ossiculum parvum in medio gerente; cicatricibus adductoribus à cardine valde remotis. Long. .155, lat. .125, alt. .06.

"Hab.—In sinu Pugetiano specimen unicum legit Kennerley; apud Neeah Bay, Swan; prope San Diegonem, Cooper." [Carpenter, 1865e, p. 58]

Although Dall, (1899), gave the reference to Carpenter's original description, he omitted it in his 1921 summary. Oldroyd, following Dall, did not give the reference nor a copy of the original description. Thus the impression is gained that Carpenter did not describe the species in detail.

The holotype bears the label, "Puget Sound, Kennerley." The specimen is of both valves, but the hinge of the right valve has a small obstruction in the umbonal area which photographed as a dark patch. The two cardinal teeth in the left valve are conspicuously large for the size of the shell.

*Holotype*.—U. S. National Museum, no. 5242

<sup>36</sup>Velain, Ch.: 1876, Comptes Rendus Acad. Sci. [Paris], 83, July 24, p. 285 *Rochefortia australis nomen nudum*; Arch. Zool. exp. gen Paris, vol. 6, 1877, p. 132 read Apr. 11, 1877 passed printing Nov. 12, 1877, title page 1878 *vide* Iredale, 1924, p. 207. Title page of volume of copy in Cornell University Library is 1877. Librarian Zool. Soc. London, G. B. Stratton, ascertained date of Angas as Aug. 1877 (Personal communications, Feb. 13, 1951).

*Distribution*.—Recent. Puget Sound, Washington (type); Shumagin Islands, Alaska, to San Diego, California (Dall); to Scammons Lagoon, Lower California (Jordan, 1926). Pleistocene. California (Grant and Gale), Mexico (Jordan 1926). Pliocene (Woodring and Bramlette 1950)

Genus *Pristes* Carpenter, 1864 [1866]

(*Pristiphora* CARPENTER, 1866a not Latreille, 1810; *Serridens*, Dall, 1899. For references see Neave 1939-40.)

*Pristes* CARPENTER, 1864b, Aug., p. 611, 643; Reprint, 1872, p. 97, 129. *Pristiphora* CARPENTER, 1866a, p. 210 substitute for *Pristes* CARPENTER, 1864b not *Pristis* LINCK, 1790 (Pisces). *Serridens* DALL, 1899, U. S. Nat. Mus., Proc., vol. 21, p. 880 substitute for *Pristiphora* CARPENTER, 1866a, not of LATREILLE, 1810 (Hymenoptera) for reference see NEAVE (1939-40).

Type species by monotypy *Pristes oblongus* CARPENTER, 1864b, p. 611, 643; Reprint, 1872, p. 97, 129 *nomen nudum*, validated CARPENTER, 1866a, p. 210. Recent. Monterey, California, to San Hipolito Point, Lower California. (Pl. 9, fig. 11-13).

Prior to the ruling of International Zoological Com., Copenhagen, 1953 (see Hemming, 1953, p. 78, Art. 34) *Pristes* Carpenter was considered preoccupied by *Pristis* Linck, 1790 (for reference see Neave, 1939-1940). Dall's *Serridens*, a substitute name for Carpenter's substitute preoccupied name of *Pristiphora* Carpenter, has been used for *Pristes oblongus* Carpenter.

Reinstating *Pristes* under the new ruling does not clear all technicalities as to the status of the name. See under *Pristes oblongus* for original indication of the genus. The type species is clearly stated. However, at the time of the presenting of the new generic name the type species *P. oblongus* was a *nomen nudum*. The writer does not regard the second statement (1864b, p. 643) adequate to describe the species (see Vokes, 1956, p. 768). In 1866a, the type species was described in detail as *Pristiphora oblonga* by Carpenter who gave the generic name as a substitute for *Pristes*. Because the problem does not involve generic names other than substitutes for the same name, and because the type species was indicated as the same in each case it seems best to maintain *Pristes* of either 1864 or 1866.

*Pristes oblongus* Carpenter

(Pl. 9, figs. 11-13)

*Pristes oblongus* CARPENTER, 1864b, Aug., p. 611, 643; Reprint, 1872, p. 97, 129

*Pristiphora oblonga* CARPENTER, 1866, Feb., California Acad. Sci., Proc., vol. III, p. 210; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 10

*Serridens oblonga* (Carpenter), DALL, 1899, U. S. Nat. Mus., Proc., vol. 21, no. 1177, p. 880; KELSEY, 1902, Nautilus, vol. 15, p. 144; DALL, 1921, p. 37; OLDROYD, 1924, p. 135, pl. 54, figs. 5, 6, 7, 8; KEEN, 1937, p. 25; BURCH, 1944, no. 40, p. 16; 1945, no. 45, p. 13  
 "*Pristes oblongus*, n.g., n.s. S. Diego." [Carpenter, 1864b, p. 611]

"*Pristes oblongus*, n.g., n.s. Like *Tellimya*, with long marginal teeth, serrated near hinge." [Carpenter, 1864b, p. 643]

Oldroyd included in her monograph a copy of the description of 1866. The following line should be added to complete that copy:

"*Hab.* San Diego; 1 worn valve among shell washings. *Cooper*." [Carpenter, 1866a, p. 210]

A specimen in the U. S. National Museum (no. 15592) on the original Carpenter glass mount has a Carpenter label in white ink, "Type S. Pedro. Cooper." This does not coincide with the original notes of Carpenter which gave the locality as San Diego only. Carpenter listed the species from "D" (1864b, p. 643) which stood for the "region between San Diego and San Pedro." This interpretation may account for the interchange of places in the locality names.

Another specimen marked "type S. Diego Hemphill" in Carpenter's writing is in the Redpath Museum (no. 15372). The locality is right for the type locality, but the collector is wrong. Hemphill collections were made after Cooper. The specimen is the same valve and same dimensions as the specimen in the U. S. National Museum. Neither specimen qualifies

for the holotype because part of the data given by Carpenter for each specimen is erroneous. The writer chooses the specimen U. S. National Museum, no. 15592 as the lectotype and the Redpath Museum specimen as a lectoparatype. The Redpath Museum specimen was found by Vicenté Condé and sent to the writer during the editing of the manuscript.

Kelsey (1902) apparently misunderstood a portion of Dall's notes to him, for it was Cooper who found the shell and not Carpenter. Carpenter was never on the Pacific Coast.

*Lectotype*.—U. S. National Museum, no. 15592; lectoparatype, Redpath Museum, no. 15372

*Distribution*.—San Pedro to San Diego, California [San Pedro] (type); Monterey, California, to San Hipolito Point, Lower California (Burch)

#### Genus *Pseudopythina* Fischer, 1878

*Pseudopythina* FISCHER, 1878, Act. Soc. Linn. Bordeaux, vol. 32, ser. 4, t. II, p. 178

Type species by monotypy, *P. Mac-Andrewi* FISCHER, 1867, Jour. de Conchyl., vol. XV, p. 194, pl. IX, fig. 1. Recent. Northern Spain and southwestern France. Portugal

#### *Pseudopythina rugifera* (Carpenter)

(Pl. 9, figs. 1-5)

*Pythina rugifera* CARPENTER, 1864b, p. 602, 643; Reprint, 1872, p. 88, 129; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 57; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 9; TRYON, 1872, Acad. Nat. Sci. Philadelphia, Proc., vol. 24, p. 233

*Lepton rude* (Dall ms.), WHITEAVES, 1880, Rept. Progress Geol. Sur. Canada, 1878-79, p. 198B, fig. 2

*Erycina* (*Pseudopythina*) *rugifera* (Carpenter), DALL, 1899, U. S. Nat. Mus., Proc., vol. 21, no. 1177, p. 880, 887, pl. LXXXVII, fig. 4

*Pseudopythina rugifera* (Carpenter), DALL, 1921, p. 37; OLDROYD, 1924, p. 136, pl. 15, fig. 9 = pl. 38, fig. 8, pl. 38, fig. 9 = DALL, 1899, pl. 87, fig. 4; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 40, pl. 27, figs. 8, 9; BAILY, 1935, West Coast Shells, (Keep) p. 78, fig. 49 = DALL, 1899, pl. 87, fig. 4; KEEN, 1937, p. 25; ABBOTT, 1954, p. 395, fig. 80a, same fig. as DALL, 1899

*Pseudopythina compressa* OLDROYD, 1924, not DALL, 1899, pl. 11, fig. 11 noted by WILLETT AND KEEN in BURCH, 1944, no. 40, p. 17; BURCH, 1944, no. 40, p. 17; no. 41, p. 20; BURCH, 1945, no. 45, p. 13

"*Pythina rugifera*, n.s. Two living sp. Intermediate between *Pythina* and *Kellia*." [Carpenter, 1864b, p. 602]

"*Pythina rugifera*, n.s. Large, thin, slightly indented; teeth minute; epidermous shaggy." [Carpenter, 1864b, p. 643]

"P. t. majore, tenuissima, valde transversa, subquadrata, vix inaequilaterali; lineis incrementi et epidermidis rugosa, confertissime laminata, ornata; umbonibus latis, valde prominentibus, antice flutentibus; marginibus, dorsalibus satis regulariter excurvatis, regione postica paulum majore; ventrali planato, seu medio concavo: intus. cardine maxime delicatulo; dente cardinali uno minore, clavicula antica laterali inconspicua; laterali postico nullo. Long. .77, lat. .44, alt. .3.

"*Hab.* In sinu Pugetiano specimina duo, (quorum unum fractum,) piscavit Kennerley.

"Inter *Pythinas* typicas et *Kellias* locum tenet." [Carpenter, 1865e, p. 58.]

From the character of the type, which is concave in the midventral line, Willett and Keen (Burch, 1944, no. 40, p. 17) are correct in believing that Oldroyd was figuring *P. rugifera* in the reference, (Pl. 11, fig. 11)

*Syntypes*.—U. S. National Museum, no. 4445 (two specimens)

*Distribution*.—Puget Sound, Washington (type); Craig, Alaska, to San Bartholome, Lower California (Willett in Burch, 1944). Commensal with *Upogebia pugettensis* (Dana) (ghost shrimp) and on the sea mouse, *Aphrodita*.

#### Genus *Lepton*, Turton, 1822

*Lepton* TURTON, 1822, Conchyliis Insularum Britannicarum, p. 61, pl. 6, figs. 1-3

Type species by subsequent designation, HERMANNSEN, 1846, Indicis Gen. Malacozoorum, vol. 1, p. 584; *Solen squamosus* MONTAGU, 1803, Test. Brit., t. 2, p. 565; Recent. British Isles, TURTON, 1822, Conchyliis Insularum Britannicarum, pl. 6, figs. 1-3.



**Lepton meroeum** Carpenter

(Pl. 10, figs. 12, 13)

*Lepton meroeum* CARPENTER, 1864b, p. 611, 643; Reprint, 1872, p. 97, 129; 1866, Feb., California Acad. Sci., Proc., vol. 111, p. 210; COOPER, 1867, Geol. Cat. Moll., Geol. Sur. California, p. 9; DALL, 1899, U. S. Nat. Mus., Proc., vol. 21, p. 879; 1921, p. 38; OLDROYD, 1924b, p. 137; KEEN, 1937, p. 21; BURCH, 1944, no. 40, p. 19, fig. p. 12 holotype; 1945, no. 45, p. 13; SCHENCK, 1945, Jour. Paleont., vol. 19, no. 5, pl. 66, fig. 8 holotype

"*Lepton meroeum*, n.s. S. Diego." [Carpenter, 1864b, p. 611]

"*Lepton meroeum*, n.s. Small, shaped like *Sinapta*." [Carpenter, 1864b, p. 643]

"*L. t. parva*, subplanata, Meroeae-formi; transversa, marginibus omnino excurvatis; antice valde producta; umbonibus acutis, prominentibus; dent. card. (V. sinistr.) uno, celato; lat. ant. prominente, post. subobsoletio; fossa cartilaginosa angusta; cic. adduct. remotis.

"Long. 0.11, lat. 0.08, alt. 0.03.

"*Hab.* San Diego, 1 broken valve among shell washings. *Cooper*." [Carpenter, 1866a, p. 210]

The holotype is a broken specimen in the U. S. National Museum, mounted on an original Carpenter glass and bearing a label in his handwriting, "Type- San Diego Cooper."

From Carpenter's original description quoted above, one notes that the holotype was broken originally. Additional breakage has occurred since Carpenter.

Dall overlooked Carpenter's original description (1866a). This was unfortunate, as Oldroyd, following Dall, missed the reference also.

Because the holotype is in bad condition good illustrations of it have not been made.

*Holotype*.—U. S. National Museum, no. 15591

*Distribution*.—San Diego, California (type); San Pedro to San Diego, California (Oldroyd); Puget Sound, Washington (Keen, 1937)

**Lasaea subviridis** Dall

*Lasaea rubra subviridis* "Carpenter," DALL, 1899, U. S. Nat. Mus. Proc., vol. 21, no. 1177, p. 881, Lower California

*Lasaea subviridis* Dall, KEEN, 1938, Malacol. Soc. London, Proc., vol. 23, pt. I, p. 29, 30, pl. 2, figs. 1-6, California and Lower California

The name used by Dall was a ms. name of Carpenter and therefore has only validity as of Dall.

## Family CARDIIDAE

Genus **Nemocardium** Meek, 1876

*Nemocardium* MEEK, 1876, U. S. Geol. Sur. Terr., v. 9, p. 167; KEEN, 1937, Bull. Muséum Roy. d'Hist. nat. Belgique, t. XIII, no. 7, 22 p.

Type species by subsequent designation, SACCO, 1899, I. Moll. Liguria, pt. 27, p. 56, *Cardium semiasperum* DESHAYES, 1860, Desc. An. sans Vert. Basin, Paris, v. 1, p. 573, pl. 55, figs. 1, 2. Eocene. Paris Basin. COSSMANN AND PISARRO, 1904, Icon. Coq. Eoc. Env. Paris, pl. 19, figs. 72-7; DESHAYES, 1860, Desc. An. sans Vert. Basin Paris, t. 1, Atlas, pl. 55, figs. 1-2

For discussion of the range of the genus, see Keen (1950, p. 23-29; 1954, p. 10)

Subgenus **Keenaea** Habe, 1951

*Keenaea* HABE, 1951, Genera of Japanese Shells: Pelecypoda, no. 2, p. 152

Type species by original designation, *Cardium samarangae* MAKIYAMA, 1934, Mem. Coll. Sci., Kyoto Univ., ser. B, vol. X, no. 2, p. 143 new name for *C. modestum* ADAMS AND REEVE, 1850, Zool. "Samarang," no. 7, p. 77 not *C. modestum* PHILIPPI, 1948 [1849] Zeitschrift für Malakozoologie, p. 142, Recent. Japan. ADAMS AND REEVE, 1850, Zool. Samarang, p. 77, pl. 22, fig. 6

**Nemocardium (Keenaea) centiflosum** (Carpenter)

(Pl. 10, figs. 7-11)

*Cardium* var. *centiflosum* CARPENTER, 1864b, p. 611, 642; Reprint, 1872, p. 97, 128; 1866,

- California Acad. Sci., vol. III, p. 209, *Fulvia* or *Laevicardium* ?; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 8
- Protocardia centiflosa* (Carpenter) DALL, 1900, Wagner Free Inst. Sci., Philadelphia, Trans., vol. III, pt. V, p. 1114; 1900, U. S. Nat. Mus., Proc., vol. 33, p. 391; ARNOLD, 1903, p. 142; DALL, 1921, p. 40; OLDROYD, 1924b, p. 146, pl. 34, figs. 2a, 2b, 2c, 2d same pl. as PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, pl. 20, figs. 2a, 2b, 2c, 2d
- Cardium (Protocardia) centiflosum* (Carpenter), PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 267, pl. 20, figs. 2a, 2b, 2c, 2d
- Laevicardium (Nemocardium) centiflosum* (Carpenter), GRANT AND GALE, 1931, p. 311, pl. 19, figs. 9, 10, see for additional synonymy
- Nemocardium centiflosum* (Carpenter), KEEN, 1937, p. 23; BURCH, 1944, no. 41, p. 27; 1945, no. 45, p. 14
- Cardium (Nemocardium) centiflosum* (Carpenter), HERTLEIN AND STRONG, 1947, Zoologica, New York Zool. Soc., vol. 31, pt. 4, p. 141
- Pratulium (?) centiflosum* (Carpenter), WOODRING, BRAMLETTE AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 85, 90, pl. 33, figs. 10, 11
- Nemocardium* (s.g.A.) *centiflosum* (Carpenter), KEEN, 1950, Jour. de Conchyl., vol. XC, no. 1, p. 29
- Nemocardium (Keenaea) centiflosum* (Carpenter), KEEN, 1954, Bull. Amer. Paleont., vol. 35, no. 153, p. 11

"*Cardium* (? *modestum*, var.) *centiflosum*. Cat. Is., 30-40 fm." [The differences between this and the Eastern Pacific shell are probably only varietal.] — [Carpenter, 1864b, p. 611]

"*Cardium* var. *centiflosum*. Probably = *Modestum*, Ad. & Rve.; but rounder, ribs sharper and more distant. Belongs to subg. *Fulvia*, Gray. 30-40 fm. Cp." [Carpenter, 1864b, p. 642]

"*Cardium* (? *modestum*, var.) *centiflosum*, Cpr. State Collection 381.

"C. t. parva, tenuissima, inflata, subquadratum rotundata; umbonibus angustis, tumidioribus; marginibus, dorsalibus subulatis, antico et ventrali aequaliter rotundatis, postico vix truncato, tota superficie, (nisi umbonibus et dorsum versus utroque latere laevibus,) tenue lirata; liris circ. centum, quoad magnitudinem extantibus, angustis; interstitiis subaequalibus, subquadratis, interdum punctato—decus satis; parte postica à linea definita, liris minus conspicuis, laminis concentricis extantibus, crebrioribus eleganter exasperata; intus, dent. card. validioribus, lat. subdistantibus; cic. adduct. ovalibus, haud impressis.

"Long. 0.51, lat. 0.48, alt. 0.34.

"*Hab.* (*modestum*) Quelpart Island, China Seas, and Japan; *A. Adams*.

"(*Centiflosum*) Monterey, 20 fms. alive; Santa Barbara 1, Catalina Island, 40 fm. Cooper.

"Rounder than *C. modestum*, *Ad. & Rve.*, with fewer and sharper ribs; but the Eastern shells vary, and Mr. Adams considers them conspecific." [Carpenter, 1866a, p. 209]

Carpenter's description of this species was one of many which Dall overlooked and which other authors have neglected to refer to.

The holotype is in the U. S. National Museum. It is a double specimen and is accompanied by an original Carpenter label, "Catalina Id. Cooper Cp. 631." The locality of this type indicates Catalina Island as the type locality in place of Monterey as frequently quoted. The types from Monterey and Santa Barbara have not been found.

*Holotype*.—U. S. National Museum, no. 15262

*Distribution*.—Recent. Catalina Island (type); Farallon Islands to Lower California (Hertlein and Strong). Pleistocene (Keen, 1954). See Table 2 for stratigraphic distribution

#### Family VENERIDAE

##### Genus *Amiantis* Carpenter, 1864

*Amiantis* CARPENTER, 1864b, p. 536, 540, 553, 620, 640, 665; Reprint, 1872, p. 22, 26, 39, 106, 126, 151; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 177; Reprint, 1872, p. 279

Type species by monotypy *A. callosa* (CONRAD), 1837, Acad. Nat. Sci. Philadelphia, Jour., vol. 7, p. 252. Recent. San Pedro, Calif., to Gulf of Tehuantepec. Palmer, 1929, Paleont. Amer., vol. I, no. 5, pl. XVI, figs. 22-24

##### Genus *Macrocallista* Meek, 1876

*Macrocallista* MEEK, 1876, U. S. Geol. Sur. Terr., vol. IX, p. 179; PALMER, 1927, Paleont. Amer., vol. I, no. 5, p. 73, 79

Type species by monotypy *Venus gigantea* Gmelin, 1791, Syst. Nat., 13 ed., t. VI, p. 3282 = *Venus nimbose* [Humphrey<sup>37</sup>], 1786, Portland Cat., p. 175. Living. Cape Hatteras, North Carolina, to Florida Keys and west to Texas.<sup>38</sup> Pliocene. Caloosahatchee beds, Florida; Pleistocene. North Carolina and Florida. PALMER, 1929, Paleont. Amer., vol. 1, no. 5, pl. X, fig. 15; pl. XIII, figs. 1, 4; pl. XIV, fig. 18; CLENCH, 1942, Johnsonia, no. 3, p. 6, pl. 4

#### Macrocallista brevisiphonata (Carpenter)

*Saxidomus brevisiphonatus* CARPENTER, 1864b, p. 607, 641, Reprint, 1872, p. 93, 127; 1865, Feb. 14, Zool. Soc. London, Proc. 1865, p. 203; Reprint 1872, p. 251; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 8; STEARNS, 1900, Nautilus, vol. 14, no. 1, p. 1; DALL, 1902, U. S. Nat. Mus., Proc., 26, no. 1312, p. 408; TOMLIN, 1923, Nautilus, vol. 37, p. 26

*Macrocallista chishimana* PILSBRY, 1905, Acad. Nat. Sci. Philadelphia, Proc., vol. LVII, p. 118, *vide* TOMLIN, 1923, Nautilus, vol. 37, no. 1, p. 26

*Callista brevisiphonata* (Carpenter), HABE, 1955, Pub. Akkeshi Mar. Biol. Sta., no. 4, p. 12, pl. 3, figs. 7, 8 see for synonymy and distribution

As suggested by Carpenter, and finally confirmed by J. R. Le B. Tomlin through examination of the type in the British Museum, this species is a Japanese form. Tomlin identified it as *Macrocallista chishimana* Pilsbry (1905), in which case Pilsbry's name would fall in synonymy. Carpenter seemed certain of the absence of a lunule on the shell he described. Lack of such a character would exclude the species from *Macrocallista* and hence would eliminate the species from *M. chishimana*. However, in the identification of *Macrocallista* by Tomlin one would assume that the shell had a lunule.

#### Genus Compsomyax Stewart, 1930

*Compsomyax* STEWART, 1930, Acad. Nat. Sci. Philadelphia, Spec. Pub. no. 3, p. 224, subgenus of *Venerella*

Type species by original designation, *Saxidomus gibbosus* GABB, 1869, = [*Compsomyax subdiaphana* (CARPENTER)]. Recent. Alaska, to Santa Barbara Islands, California. Pliocene—Recent. California. STEWART, 1930, Acad. Nat. Sci. Philadelphia, Spec. Pub., no. 3, pl. 14, fig. 6, *Saxidomus gibbosus* Gabb, lectotype. (pl. 10, figs. 1–6 [*C. subdiaphana* (Carpenter)])

*Distribution of the Genus.*—?Miocene—Recent. West Coast.

#### *Compsomyax subdiaphana* (Carpenter)

(Pl. 10, figs. 1–6)

?*Clementia subdiaphana* CARPENTER, 1864b, p. 602, 607, 640; Reprint, 1872, p. 88, 93, 126; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 56; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 7; DALL, 1892, U. S. Nat. Mus., Proc., vol. 14, no. 849, p. 185, pl. VII, figs. 5, 6; WILLIAMSON, 1893, Nautilus, vol. 6, no. 10, p. 116; JUKES-BROWNE, 1914, Malacol. Soc. London, Proc., vol. 11, p. 78

*Marcia* (*Venerella*) *subdiaphana* (Carpenter), DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, no. 1312, p. 397

*Callista subdiaphana* (Carpenter), ARNOLD, 1903, p. 144, pl. XIII, fig. 4; ARNOLD, 1907, U. S. Nat. Mus., Proc., vol. 32, no. 1545, p. 544, pl. XLIX, fig. 3 as *Callista*

*Clementia obliqua* JUKES-BROWNE, 1913, Ann. Mag. Nat. Hist., ser. 8, vol. XII, p. 59, pl. 1, figs. 1, 2; DALL, 1914, Nautilus, vol. 27, no. 9, p. 103; JUKES-BROWNE, 1914, Ann. Mag. Nat. Hist., ser. 8, vol. XIII, p. 338

*Marcia subdiaphana* (Carpenter), PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 268, pl. 19, fig. 3; DALL, 1921, p. 42, section *Venerella*; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 47, pl. 27, fig. 1; pl. 37, fig. 4 same fig. as PACKARD, 1918, pl. 19, fig. 3; OLDROYD, 1924b, p. 155, pl. 38, fig. 1 same fig. as OLDROYD, 1924a, pl. 27, fig. 1; pl. 33, fig. 3 same fig. as PACKARD, 1918, pl. 19, fig. 3, section *Venerella*

*Venerella* (*Compsomyax*) *subdiaphana* (Carpenter), STEWART, 1930, Acad. Nat. Sci. Philadelphia, Spec. Pub., no. 3, p. 224; in part, illustrated specimen is of *Saxidomus gibbosus* Gabb, lectotype

<sup>37</sup>See Wilkens (1955, p. 87, 88, pl. 17, figs. 16–17) for discussion of *Venus nimbose* [Humphrey], 1786 versus Solander, 1786, and designation of lectotype of *Venus nimbose* [Humphrey].

<sup>38</sup>Vicenté Condé of Cardenas, Cuba, in extensive shell collecting on that island, never obtained this species. He doubts the Cuban record (Personal communication).

*Clementia (Compsomyax) subdiaphana* (Carpenter), GRANT AND GALE, 1931, p. 334, pl. 17, figs. 10a, 10b, ? 15, see for additional synonymy

*Compsomyax subdiaphana* (Carpenter), KEEN, 1937, p. 19; KEEN AND BENTSON, 1944, Geol. Soc. Amer., Sp. Paper no. 56, p. 38, 105, 118; BURCH, 1944, no. 42, p. 11; 1945, no. 45, p. 15; HERTLEIN AND STRONG, 1948, Zoologica, New York Zool. Soc., vol. 33, pt. IV, p. 191; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 174; ABBOTT, 1954, p. 411, pl. 31f; fig. 81a, b, same figs. as DALL, 1892, U. S. Nat. Mus., Proc., vol. 14, no. 849, p. 185

*Katherinella (Compsomyax) aff. K. subdiaphana* (Carpenter), WOODRING, 1938, U. S. Geol. Sur., Prof. Paper 190, p. 11, 54, pl. 6, fig. 12, lower Pliocene. See for additional references for fossil occurrence

*Katherinella (Compsomyax) subdiaphana* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 84, 90, 93, pl. 33, fig. 7-9. Pleistocene. Palos Verdes Hill, California

"*Clementia subdiaphana*, n.s. Very rare, living. Intermediate between *Clementia* proper and the *prora* group of thin *Callistae*." [Carpenter, 1864b, p. 602]

"*Clementia subdiaphana*, Vanc. Is., Forbes. One broken sp." [Carpenter, 1864b, p. 607]

"? *Clementia subdiaphana*, n.s. Hinge normal, very thin, ashy." [Carpenter, 1864b, p. 640]

"? *C. t. ovali*, quoad genus valde transversa, tumida, tenuissima; pallide cinerea, epidermide pallide straminea; subdiaphana, sed subcalcareo, haud porcellana; laevi, nisi striis incrementi; haud lunulata, umbonibus satis prominentibus: intus, valva dextra, dentibus anticis duobus acutis, contiguis, elevatis, postico elongato, acuto, bifido, ligamento parallelo; valva sinistra dentibus anticis duobus umbonem versus junctis, acutis, divergentibus, postico elongato, acuto, simplici; sinu pallii, ut in *Dosinia*, angusto, angulato, per didimium interstitii umbones verses porrecto. Long. .72, lat. .58, alt. .34.

"*Hab.*—In sinu Pugetiano specimina quaedam, plerumque juniora, piscavit Kennerley: ex insula Vancouver, specimen fractum portavit Forbes.

"Textura *Lucinopsae* convenit; cardine, *Clementiae*; formâ, *Saxidomo squalido* juniori." [Carpenter, 1865e, p. 56]

Dall (1892) gave a detailed description and figured an adult shell of this species from Alaska. Carpenter's type was a young shell. The holotype is a double shell in the U. S. Nat. Museum, with the label, " ? *Clementia subdiaphana* Cpr. Type. Puget Sound. Dr. Kennerly."

Woodring (1938, p. 54) doubted that the above type was the holotype, because he considered that the measurements of the specimen did not coincide with those given by Carpenter. However, the measurements correspond so closely<sup>39</sup> that that factor does not seem valid. Woodring designated the type specimen as a lectotype. Since there is no other specimen which can qualify in the type category of this species, the U. S. National Museum, no. 4541 specimen remains the type regardless of what strict term is used.

The type is not in the British Museum, as Stewart (1930, p. 225) presumed. The following data regarding type material were furnished by G. L. Wilkins of the Department of Zoology, British Museum:

"I have searched for *Clementia subdiaphana*, Carpenter, but all we have is a specimen attached to a bright blue label (one of several such in the Cuming Coll.) with a printed statement 'named from the type specimen in the Smithsonian Institution, Washington, D. C.,' the name is written in M.S.S. with the locality 'Puget Sound.'"

The above cannot be included in syntypic material. It is one of the many thousands of specimens sent from the Smithsonian in the 1860's and 1870's with that standard label to the molluscan departments of the institutions of the world. If, as in some cases, no original material exists, such specimens will be useful from which to choose a "neotype."

Stewart united the fossil *Saxidomus gibbosus* Gabb, 1869, with this species, and Grant and Gale reported the species back to the Pliocene and possibly Miocene. They did not believe in an identity with *Pitar oregonensis* (Conrad) which had been suggested. The general pitaroid form of various species suggests identity, but often such apparent similarities are mislead-

<sup>39</sup> Carpenter's measurements, .72 long. and .58 lat., would equal 18.28 mm. long. (length) and 14.732 mm. lat. (height), which is practically the dimensions given by Woodring for the specimen, U. S. National Museum, no. 4541, "length, 18.5 mm.; height, 15 mm." Such a difference in mm. can be accounted for in the measurements by different individuals. For Carpenter's terms of measurements see notes under explanatory remarks, this paper.

ing. Woodring (1938, p. 54) discussed the possibility of an alliance of this species with "*Venus*" *angustifrons* Conrad (1849) from the Miocene of Oregon. In such a case Conrad's name would have priority over that of Carpenter which had been used for the Recent shells.

*Holotype*.—U. S. National Museum, no. 4541

*Distribution*.—Recent. Puget Sound, Washington (type); Sannakh Islands, Alaska, to the Cedros Islands, Lower California (Hertlein and Strong). ? Miocene—Pleistocene. California. ? Pliocene. Oregon (Grant and Gale.) ? Miocene. Oregon (Woodring)

#### Genus *Humilaria* Grant and Gale, 1931

*Humilaria* GRANT AND GALE, 1931, San Diego Soc. Nat. Hist., Mem., vol. 1, p. 325

Type species by original designation, *Venus kennerleyi* "Carpenter in Reeve" = *H. perlaminosa kennerleyi* CARPENTER in REEVE, 1863, Icon. Conch., vol. 14, pl. XII, fig. 41; GRANT AND GALE, 1931 = *H. kennerleyi* (Reeve). Recent. Kodiak Island, Alaska, to Carmel Bay, California. REEVE, 1864, Icon. Conch., vol. 14, *Venus*, pl. XII, fig. 41; OLDROYD, 1924, pl. 8, fig. 4 (Pl. 9, figs. 14–15)

#### *Humilaria kennerleyi* (Reeve)

(Pl. 9, fig. 14, 15)

*Venus Kennerleyi* [Carpenter ms.], REEVE, 1863, Conch. Icon., vol. 14, *Venus*, pl. XII, fig. 41; CARPENTER, 1864b, p. 553, 569, 600, 602 (*V. kennerleyi*), 641; Reprint, 1872, p. 39, 55, 86, 88, 127; on p. 602, 641, Carpenter credits the species to REEVE; 1865, Acad. Nat. Sci. Philadelphia, Proc., 17, p. 57

*Mercenaria Kennerleyi* Reeve, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 7

*Marcia kennerleyi* (Carpenter ms.) Reeve, DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, no. 1312, p. 396, pl. XIV, fig. 1 (Carpenter ms.) Reeve; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 47, pl. 24, fig. 4

*Marcia kennerlyi* (Carpenter) Reeve, DALL, 1921, p. 42; OLDROYD, 1924b, p. 155, pl. 8, fig. 4

*Venerupis* (*Humilaria*) *perlaminosa kennerleyi* (Carpenter in Reeve), GRANT AND GALE, 1931, p. 325

*Venerupis* (*Humilaria*) *kennerleyi* (Reeve), BAILY, 1935, West Coast Shells, KEEP, p. 90, fig. 61

*Humilaria kennerleyi* (Carpenter in Reeve), KEEN, 1937, p. 21; BURCH, 1944, no. 42, p. 11; 1945, no. 45, p. 15; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 174

"Shell oblong oval, somewhat square, dull opake white, concentrically plicately ribbed, ribs close-set, a little recurved, rather irregular, lunule and ligamentary area narrow.

"Carpenter, MS. in Mus. Cuming.

"*Hab.*—?"

"A very characteristic chalk-white shell, strongly plicately concentrically ribbed, the ribs being very crowded and irregular." [Reeve, 1863]

Carpenter's complete description of this species was published in 1865 after Reeve described the form in 1863. As Carpenter explained, his description was written but delayed because of the American war. Carpenter's authorship was unfortunately lost because of the vicissitudes which prevail in publication. Reeve's description and figure hold the specific name so that Carpenter's description is not included in this case. Carpenter considered Reeve the author of the species.

Reeve did not record the locality of the species, but Carpenter furnished that information (1864b, p. 569, 602). The shell had been collected by Dr. Kennerley and, therefore, properly belonged in the Puget Sound—Vancouver Island district (Carpenter, 1864b, p. 569, 602, 641). The holotype in the British Museum (Natural History) is labelled from "Van Couver's [*sic*] Is. (Mus. Cuming)." <sup>40</sup> "Puget Sound" is written faintly on one of the valves."

*Holotype*.—British Museum (Natural History)

*Distribution*.—Vancouver Island, British Columbia (type); Kodiak Island, Alaska, to Carmel Bay, California (Burch)

<sup>40</sup> (G. L. Wilkins, April 11, 1950, personal communication) The illustrations of the hinge of the holotype with a tracing of the valve for measurement were furnished by the British Museum (Natural History).

"*Tivela ? marginata*" Carpenter *nomen nudum*

"*Tivela* (?) *marginata* Cpr." in BERRY, 1907, *Nautilus*, vol. 21, p. 20; LAMY, 1917, *Jour. de Conchyl.*, vol. LXII, p. 204; BURCH, 1944, no. 39, p. 9

*Tivela marginata* Carpenter is a *nomen nudum*. The name was probably with a museum specimen, which was the basis for Dall's (1902, p. 386) remarks: [*Tivela delesserti* Deshayes, 1854, Lower California and Mexico] "the young fry were named *Tivela marginata* by Carpenter, but I do not find that this name has ever been defined in print." It is strange that Dall should have passed the name on to Berry in a faunal list. See also "*Crassatella marginata* Carpenter."

Genus *Protothaca* Dall, 1902

*Protothaca* DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, p. 364

Type species by original designation *Venus thaca* MOLINA, 1782, *Saggio sulla storia Naturale del Chile*, p. 203, *V. dombeyi* LAMARCK, 1818, *Hist. Ann. s. Vert.*, vol. 5, p. 590. Recent. Peru to Chonos Archipelago, Chile. REEVE, 1863, *Conch. Icon.*, vol. 14, *Venus*, pl. IX, fig. 29 (*V. Dombeyi*)

This genus is represented in the living and fossil fauna of New Zealand by the subgroup *Tuangia* (Marwick, 1927, p. 623; personal communication, January 19, 1951), [*T. crassicosta* (Deshayes)] which has not been found earlier than Pleistocene.

Subgenus *Callithaca* Dall, 1902

*Callithaca* DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, no. 1312, p. 364

Type species by original designation, *Tapes tenerrima* CARPENTER, in GOULD AND CARPENTER, 1856, *Zool. Soc. London, Proc.*, p. 200. Recent. Vancouver Island, to Cape San Lucas, Lower California, OLDROYD, 1924, pl. 30, figs. 1a, 1b

*Protothaca* (*Callithaca*) *laciniata* (Carpenter)

*Tapes laciniata* CARPENTER, 1864b, 540, 571, 641; Reprint, 1872, p. 26, 57, 127; 1865, *Jour. de Conchyl.*, vol. XIII, ser. 3, vol. V, p. 136; Reprint, 1872, p. 304; COOPER, 1867, *Geog. Cat. Moll.*, *Geol. Sur. California*, p. 7; ARNOLD, 1903, p. 150, pl. XIV, fig. 5

*Paphia* (*Protothaca*) *staminea* var. *laciniata* (Carpenter), DALL, 1902, U. S. Nat. Mus., vol. 26, no. 1312, p. 398; JUKES-BROWNE, 1914, *Malacol. Soc. London, Proc.*, vol. II, p. 83

*Paphia* (*Protothaca*) *staminea laciniata* (Carpenter), DALL, 1921, p. 43, section *Protothaca Paphia staminea laciniata* (Carpenter), OLDROYD, 1924, *Pub. Puget Sound Biol. Station*, vol. 4, p. 48

*Paphia staminea laciniata* (Carpenter), OLDROYD, 1924b, p. 157, section *Callithaca Venerupis* (*Protothaca*) *staminea* Conrad variety *laciniata* (Carpenter), GRANT AND GALE, 1931, p. 331

*Protothaca laciniata* (Carpenter), KEEN, 1937, p. 24; BURCH, 1944, no. 42, p. 14; BURCH, 1945, no. 45, p. 15; FINCH, 1953, *Dept. Fish and Game Marine Fish.*, *Fish. Bull.* no. 90, p. 68, fig. 34

"*Tapes laciniata*, n.s. Large, swollen, brittle, ashen; sculpture pectinated." [Carpenter, 1864b, p. 641]

"T. t. 'T. staminea' simili, sed majore, fragili, multo tenuiore; satis tumida, subovali, regulariter excurvata, cinerea; lunula linea impressa, parum definita; marginibus, postico vix subquadrato, antico producto; ligamento haud prominente; costis radiantibus acutis, distantibus, ventraliter dimidium interstitiorum aequantibus, postice parvis, crebris, antice latis; laminis concentricis creberrimis, vix erectis, costas transeuntibus, a costis et interstitiis eleganter undatis, haud nodosis; pagina interna albidia; dentibus cicatricibusque ut in 'T. staminea' formatis; sinu pallii paulum longiore.—Long. 2.4, lat. .2, alt. 1.4, poll.

"Hab. San Diego, Rich, Blake, Cooper.

"Cette espèce est remarquable, en même temps pour la délicatesse de sa sculpture, et pour les caractères particuliers de sa texture. Elle appartient au même groupe que les *T. adamsii*, Reeve, *T. tenerrima*, Carpenter (décrit d'après un individu très-jeune) et *T. staminea*, Conrad. Cette dernière espèce compte parmi ses variétés les *V. Petitii* et *V. ruderata*, Deshayes, *V. mundulus*, Reeve (= *T. diversa*, Sowerby) et *V. tumida*, Sowerby. Mais elle se distingue

facilement de toutes ces formes par ses lames concentriques, disposées au-dessus des rayons et de leurs interstices bien prononcés, et laciniées au sommet fort élégamment."

[Carpenter, 1865g, p. 136]

The type of this species has not been found. The collections of the British Museum (Natural History) have been searched, as well as those in likely institutions in America.

Although Carpenter recorded the species from Monterey and the region between San Diego and San Pedro (1864b, p. 641), San Diego is given as the type locality in Carpenter's (1865g) description. There seems to be a difference of opinion among workers as to the specific rank of this form.

Mrs. Oldroyd and Grant and Gale omitted reference to the complete description by Carpenter of this species in 1865.

*Type*.—Not found

*Distribution*.—Recent. San Diego, California (type); Unalaska, Alaska, to Estero de Todos Santos Bay, Lower California (Burch). Pleistocene. Mexico (Jordan 1926)

#### *Protothaca (Callithaca) staminea* (Conrad)

(Pl. 11, figs. 1-5)

*Forma orbella* Carpenter

*Tapes staminea* var. *orbella* CARPENTER, 1864b, p. 641; Reprint, 1872, p. 127; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 8; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 266

*Paphia (Protothaca) staminea* var. *orbella* (Carpenter), DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, no. 1312, p. 398, JUKES-BROWNE, 1914, Malacol. Soc. London, Proc., vol. 11, p. 83  
*Paphia staminea* (Conrad) var. *orbella* (Carpenter), PACKARD, 1918, Univ. California Pub. Zoology, vol. 14, p. 271, pl. 19, fig. 6

*Protothaca staminea orbella* (Carpenter), DALL, 1921, p. 43; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 48, pl. 37, fig. 6 same as PACKARD, 1918, pl. 19, fig. 6; OLDROYD, 1924b, p. 157, pl. 33, fig. 6 same as PACKARD, 1918, pl. 19, fig. 6; BURCH, 1944, no. 42, p. 13

"? *Tapes tumida* Con Nutt. ms." CARPENTER, 1856, Zool Soc. London, Proc., p. 214; 1857, Rept. British Assoc. Adv. Sci., p. 196, 306; 1864b, p. 641; Reprint, 1872, p. 127; DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, p. 399 "not *T. tumida* SOWERBY, 1853, Renamed *T. conradi* by RÖMER, 1867," fide DALL, 1902, p. 399

"*Tapes staminea*, Conr. . . . Var. *orbella*, rounded, globose." [Carpenter, 1864b, p. 127]

This form is regarded as an ecological accommodation to the animal's habit of nestling in pholad borings. It is not considered a species, but because specimens identified by Carpenter were available the form is figured to show what Carpenter had in mind. The type was not found. The specimens figured are from Neah Bay, collected by J. G. Swan, and are contained in the U. S. National Museum. The suite consists of four double valves and one single right valve. One double specimen is abnormally produced anteriorly and shortened with a thickened knob posterior.

A medium globose specimen is figured.

A type of "*Tapes tumida*" Con. Nutt. ms. Carpenter has not been found. It is not in the British Museum (Natural History), where it might be. (G. L. Wilkins, May 22, 1950, personal communication).

From an ecological study of more than 3000 specimens of *P. staminea* in the region of Victoria, British Columbia, Fraser and Smith (1928, p. 266) found that "there was much difference in shape in different localities: some long and narrow, others short and broad; some thin, with flat shells, others thick, with strongly convex shells."

*Specimens figured*.—U. S. National Museum, No. 15453

*Distribution*.—Kodiak Island, Alaska, to San Diego, California (Dall)

#### *Protothaca (Callithaca) tenerrima* (Carpenter)

*Tapes tenerrima* CARPENTER, in GOULD AND CARPENTER, 1856, Zool. Soc. London, Proc., p. 200; CARPENTER, 1857, Rept. British Assoc. 1856, p. 227, 229, 306; 1864b, p. 531, 536, 614, 641; Reprint, 1872, p. 17, 22, 100, 127, 304; COOPER, 1867, Geog. Cat. Moll., Sur. California, p. 7; 1888, 7th Ann. Rept. California State Min. Bur., p. 267

- Venus rigida* GOULD, 1861, U. S. Expl. Exped. 1856, f. 538 not DILLWYN, 1817, vol. 1, p. 164  
*vide* Carpenter, 1864b, p. 531
- Tapes tenerrima* Carpenter, ARNOLD, 1903, p. 151, pl. XIV, fig. 6
- Paphia (Protothaca) tenerrima* (Carpenter), DALL, 1902, U. S. Nat. Mus., vol. 26, no. 1312, p. 364, 399, section *Callithaca*; 1921, p. 43; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 24, p. 47, pl. 31, figs. 1a, 1b same as in PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, pl. 22, figs. 1a, 1b; OLDROYD, 1924b, p. 156, pl. 30, figs. 1a, 1b same as PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, pl. 22, figs. 1a, 1b
- Protothaca tenerrima* (Carpenter), JUKES-BROWNE, 1914, Malacol. Soc. London, Proc., vol. 11, p. 83; KEEN, 1937, p. 24; BURCH, 1944, no. 42, p. 12; 1945, no. 45, p. 15; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 175; FINCH, 1953, Dept. Fish and Game Marine Fish., Fish Bull. no. 90, p. 65, fig. 31
- Paphia tenerrima* (Carpenter), PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 272, pl. 22, figs. 1a, 1b; FRIZZELL, 1931, Nautilus, vol. 44, no. 2, p. 48
- Venerupis (Callithaca) tenerrima* (Carpenter), GRANT AND GALE, 1931, p. 327, pl. 18, figs. 9a, 9b

"T. t. tenerrima, albido-fusca, obovali, compressa; marginibus aequaliter excurvatis; striulis radiantibus creberrimis, antice et postice fortioribus, et lirulis acutis concentricis, plus minusve distantibus, eleganter ornata; lunula vix stria majore definita; intus, dent. card. iii. radiantibus, quorum valva in altere ii. Altera i. bifidi sunt; sinu pallii maximo, elongato, lateribus suberectis, parum divergentibus, apice cicatr. ant. contiguo, subrotundato; margine vix crenulato.

"Long. .94, lat. 1.13, alt. .38.

"Hab. Panama; legit Col. Jewett. Mus. Gould.

"Of this extremely elegant species, the two specimens sent were broken in transit. It is recognized at once by its fragility and delicate sculpture." [Carpenter, 1856c, p. 201]

". . . proves to be the adult form of *Tapes tenerrima*, Cpr., P. Z. S. July 1856, which is a Californian and not a Panamic species, as has been supposed from Col. Jewett's label." [Carpenter, 1864b, p. 531]

The type of this species has not been recovered. Carpenter wrote (1856c) that the two original specimens were broken before they reached him in England. This suggests that the specimens became further damaged or lost and were not returned to America. They are not in the British Museum (Natural History) (G. L. Wilkins, personal communication).

The original description, following Jewett's label, stipulated Panama as the type locality. But Carpenter later corrected that statement and confirmed his idea that the shells came from California. However, no definite California locality could be given. Oldroyd apparently was not aware of Carpenter's correction of Jewett's Panama label, for she quoted "Panama" as the type locality. This was repeated by Grant and Gale.

The acceptance of Panama as the type locality probably accounts for the error of extending the distribution to Panama (Grant and Gale, 1931, p. 328).

Cooper (1867) corrected the locality from "Panama", to "Str. Fuca to San Diego".

The types are not in the Boston Society of Natural History as published by Oldroyd and copied by Grant and Gale.

Carpenter, in the description of *Tapes laciniata* (1865g, p. 136) parenthetically stated that this species had been described from a young individual.

*Types*.—Not found

*Distribution*.—Recent. California (type); Vancouver, British Columbia, to Cape San Lucas, Lower California (Keen). Pleistocene and Pliocene. (See Grant and Gale, 1931) Pleistocene. Mexico (Jordan, 1926)

#### Genus *Psephidia* Dall, 1902

(*Psephis* Carpenter, 1864, not *Psephis* Guenée, 1854 Insects)

*Psephidia* DALL, 1902, Jour. Conch., vol. X, p. 243. Substitute for *Psephis* CARPENTER, 1864b, p. 640, 641; Reprint, 1872, p. 126, 127; 1865, Acad. Nat. Sci., Philadelphia, Proc., vol. 17, p. 56

Type species by original designation [*Psephidia* replaced *Psephis*], *P. lordi* (Baird), 1863, Zool. Soc. London, Proc., p. 69. Recent. Unalaska, Alaska, to Coronado Islands. California. DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, pl. XVI, fig. 5; GRANT AND GALE, 1931, pl. 15, figs. 5-7



***Psephidia salmonea* (Carpenter)**

(Pl. 11, figs. 6-12)

*Psephis salmonea* CARPENTER, 1864b, p. 539, 611, 641; Reprint, 1872, p. 25, 97, 127; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 209; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 7; ARNOLD, 1903, p. 152; DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, no. 1312, p. 408, nepionic young of *Tivela*

? *Psephidia salmonea* (Carpenter), DALL, 1921, p. 44; OLDROYD, 1924, p. 162 [not questioned]  
*Psephidia* ? *salmonea* (Carpenter), GRANT AND GALE, 1931, p. 338, see for synonymy  
*Psephidia salmonea* (Carpenter), KEEN, 1937, p. 24; BURCH, 1944, no. 42, p. 16; 1945, no. 45, p. 16

"*Psephis salmonea*, n.s. S. Diego, Cat. Is., 30-40 fm.; rare." [Carpenter, 1864b, p. 611]

"*Psephis salmonea*, n.s. Very small, rounded, teeth elongate: salmon-coloured. 30-40 fm. r. Cp." [Carpenter, 1864b, p. 641]

"*Psephis salmonea*, Cpr., n.s. State Collection, no. 1068.

"Ps. t. Parva, subinflata, subaequilaterali, subtrigona; colore salmoneo; extus nitida, minutissime et creberrime concentricè striata; margine ventrali excurvato; dorsalibus antico et postico subrectis: intus, dent. card. iii.-iii., quorum utraque valva anticus porrectus, quasi lateralis, centrales parvi; v. dextr. dente postico in marginem sulcatum decurrente; cicatr. adduct. satis conspicuis, subrotundatis; linea pallii satis interna, vix obsolete sinulata.

"Long. 0.12, lat. 0.11, alt. 0.06.

"Hab. Catalina Island, 30-40 fm., rare; Cooper.

"Placed under *Psephis* by analogy; whether the animal be ovoviviparus has not yet been ascertained." [Carpenter, 1866a, p. 209]

The syntypes of this species consist of two suites, one in the Redpath Museum, McGill University, and the other at the U. S. National Museum. The specimens in the Redpath Museum consist of five specimens on Carpenter's original glass mount and labelled in Carpenter's handwriting, "Type. Catalina Is. 30 fms. Cooper." These are the specimens which are mentioned in the original description. The U. S. National Museum specimens, a syntype consisting of a double specimen, is also on a Carpenter original glass mount and labelled, "type S. Diego Cooper Cp. 1068." These are the specimens which are mentioned first by Carpenter (1864b, p. 611). The label "Cooper no. 1068" is that given as of the State Collection in his original description.

Oldroyd, followed by Grant and Gale, gave the type depository and type locality incorrectly.

*Syntypes*.—Redpath Museum, no. 115; U. S. National Museum, no. 15578 (Cp. 1068)

*Distribution*.—Recent. Catalina Island, California, 30 fathoms, (type); Farallon Islands, California, to San Martin Island, Lower California (Burch). Pleistocene (Arnold, 1903; Cooper in Arnold, 1903). Pliocene (Arnold, 1903)

**"*Tapes gracilis*" Gould**

*Tapes gracilis* GOULD, 1856, United States Pacific R. R. Repts., vol. 5, p. 333, pl. 19, fig. 20; GOULD AND CARPENTER, 1856, Zool. Soc. London, Proc., p. 200.

This species has been identified by Dall as the young of *Saxidomus nuttallii* Conrad, 1837. Carpenter stated (1864b) that the type of *T. gracilis* Gould was not found at the Smithsonian Institution.

Additional References:—

*Tapes gracilis* GOULD, CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856, p. 227, 284, 306, 352; CARPENTER, 1864b, p. 592; Reprint, 1872, p. 78

*Saxidomus gracilis* GOULD, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 8 (= *aratus* Gld. ?)

*Saxidomus aratus* GOULD, WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 189  
*Saxidomus nuttallii* CONRAD, GRANT AND GALE, 1931, p. 341 in part

**"*Venus (Chione) excavata*" Carpenter**

(Pl. 11, fig. 13)

***Chione undatella* Sowerby, Young**

*Venus (Chione) excavata* CARPENTER, 1856, Zool. Soc. London, Proc., p. 216; DALL, 1902, U. S. Nat. Mus., Proc., vol. 26, no. 1312, p. 392

This species was determined by Dall as the young of *Chione undatella* Sowerby (1835, p. 22).

The type is in the British Museum (Natural History) (*vide* G. L. Wilkins, March 2 and July 10, 1951, personal communication), and the photograph of the specimen has been provided by the officials of the British Museum (Natural History).

Additional references:

*Venus (Chione) excavata* CARPENTER, 1857, Rept. British Ass. Adv. Sci. 1856, p. 197  
*Venus excavata* CARPENTER, 1860, Smith, Misc. Coll., vol. 2, art. 6, p. 2; GRANT AND GALE, 1931, p. 322 in synonymy of *Chione succinta*  
*Chione excavata* CARPENTER, 1864b, p. 527, 641; Reprint, 1872, p. 13, 127; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 7

#### Family PETRICOLIDAE

#### Genus *Petricola* Lamarck, 1801

*Petricola* LAMARCK, 1801, Syst. Animaux sans Vert., p. 121

Type species by subsequent designation, SCHMIDT, 1818, Conch. Samm., p. 55, 79; *Venus lapicida* CHEMNITZ, 1788, Conch. Cab., vol. X, p. 356, tab. 172, figs. 1664, 1665. Recent. Australia. SOWERBY in REEVE, 1874, Conch. Icon., vol. 19, *Petricola*, pl. III, fig. 24

#### Subgenus *Rupellaria* Fleury de Bellevue, 1802

*Rupellaria* FLEURIAU DE BELLEVUE, 1802, Jour. Physique, vol. 54, p. 347

Type species by subsequent designation, DALL, 1900, Wagner Free Inst. Sci., Philadelphia, Trans., vol. III, pt. V, p. 1056-1058; *Venus lithophaga* RETZIUS, 1786, Act. Acad. Turin, vol. 3, p. 11. Recent. England to Spain and Mediterranean. SOWERBY in REEVE, 1874, Conch. Icon., vol. 19, *Petricola*, pl. II, figs. 11a, 11b; BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1893, Moll. Marins du Roussillon, t. II, pl. 67, figs. 20-25

#### *Petricola (Rupellaria) tellimyalis* (Carpenter)

(Pl. 12, figs. 1-5)

*Psephis tellimyalis* CARPENTER, 1864b, p. 641; Reprint, 1872, p. 127; 1865, Jour. de Conchyl., vol. XIII, ser. 3, vol. V, p. 135; Reprint, 1872, p. 303; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 7; DALL, 1900, Nautilus, vol. 13, no. 9, p. 100 young *Petricola*

*Petricola denticulata* Sowerby, DALL, 1900, Nautilus, vol. 13, no. 11, p. 121 in part; 1903, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. V, p. 1061 in part; 1921, p. 44 in part; OLDROYD, 1924b, p. 163 in part probably; GRANT AND GALE, 1931, p. 356 in part changed in footnote, section *Petricolaria*. Not *P. denticulata* SOWERBY, 1834, Zool. Soc. London, Proc., p. 47; 1855, Thes. Conchyl., vol. II, p. 773, pl. CLXVI, figs. 6, 7

*Psephis (Petricola) tellimyalis* Carpenter, WILLETT, 1931, So. California Acad. Sci., Bull., 30, no. 2, p. 39, pl. 17, figs. 1, 2

*Petricola tellimyalis* (Carpenter), GRANT AND GALE, 1931, p. 356, footnotes; PILSBRY AND LOWE, 1932, Acad. Nat. Sci. Philadelphia, Proc., vol. LXXXIV p. 97, pl. 13, figs. 12, 13; BURCH, 1948, no. 83, p. 9, figs.

*Petricola (Rupellaria) tellimyalis* (Carpenter), BURCH, 1944, no. 42, p. 19, figs.; 1945, no. 45, p. 16

*Rupellaria tellimyalis* (Carpenter), ABBOTT, 1954, p. 420, pl. 31t

"*Psephis tellimyalis*, n.s. Shape of *Tellimya*: central tooth minute; outside teeth long." [Carpenter, 1864b, p. 641]

"Ps. t. valde transversa, subquadrata, tumidiore, valde inaequilaterali; umbonibus obtusis, vix prominentibus; pallide carneolutescente, purpureo (maxime circa marginem dentesque) tincta; epidermide tenuissime induta; tota superficie creberrime concentricè striata; marginibus, dorsali et ventrali subparallelis, antico rectiore, postico rotundato; lunula inconspicua; intus, dentibus centralibus minimis, anticis elongatis, posticis valde elongatis: sinu pallii vix sinuato.—Long. .09, lat. .07, altit. .04, poll.

"Hab. Californie (sur la partie dorsale d'une *Haliotide*, Rowell).

"Le sous-genre *Psephis* se compose de très-petites coquilles vénériciformes, dont l'animal est ovipare, comme celui des *Cyclas*, etc., des eaux douces, et des *Bryophila* parmi les *Lamellibranches* marins. La charnière porte trois dents; quelquefois elles ressemblent à celles des *Chione*; mais ordinairement les dents antérieures et postérieures se prolongent. Le *Psephis tellimyalis* se trouve sur les limites extrêmes du groupe. Il a l'aspect extérieur d'un *Tellimya bidentalis* et quelque chose aussi de sa charnière à cause du très-grand développement des deux dents terminales aux dépens de la dent centrale. Je n'en ai vu qu'un seul échantillon, qui appartient au révérend J. Rowell, pasteur à San Francisco." [Carpenter, 1865g, p. 135]

Willett (1931) changed the previous idea rendered by Dail (1900) that the species described by Carpenter was the young of *P. denticulata* Sowerby (1834). Willett figured specimens of both species. His figures justified a separation. The individuals figured by Willett (1931) are more triangular than the holotype. Burch in commenting on Willett's article included tracings of unidentified specimens in the Burch collection from San Martin Island, Mexico, which are closer in appearance to the shape of *P. tellimyialis* than are those of Willett or Pilsbry and Lowe (1932).

The holotype is in the U. S. National Museum on an original Carpenter glass mount with original label, consisting of: "Type *Psephis tellimyialis*, Cpr. California."

Carpenter stated originally that the specimens came from the back of haliotids (1865g, p. 135). He did not know the locality and suggested Lower California. The label in the type box states "San Diego Stearns Coll." That label is subsequent to the Carpenter glass mount, however. The writer does not believe that a locality other than California would be authentic for the original specimens.

The measurements of the holotype (2.5 mm.; 2 mm.) correspond to the dimensions originally stated of .09 poll (2.27 mm.) and .07 poll (1.77 mm.), with a negligible difference.

*Holotype*.—U. S. National Museum, no. 15554

*Distribution*.—Recent. California (type); Santa Monica, California, to San Martin, Mexico (Burch, 1945). See Table 2 for stratigraphic distribution.

#### Genus *Cooperella* Carpenter, 1864

(*Oedalia* Carpenter, 1864; *Oedalina* Carpenter, 1865)

*Cooperella* CARPENTER, 1864b, p. 611 (first mentioned), p. 639 (*Oedalia* Carpenter not Meigen, 1820); CARPENTER, 1865, California Acad. Sci., Proc., vol. III, p. 208, *Oedalina* and *Cooperella*; DALL, 1900, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. V, p. 1061; JUKES-BROWNE, 1910, Malacol. Soc. London, Proc., vol. 9, p. 217, 221, 223, 224

Type species by subsequent designation, DALL, 1900, Wagner Free Inst. Sci. Philadelphia, vol. III, pt. V, p. 1061, *Cooperella subdiaphana* CARPENTER (+ *scintillaeformis* Carpenter), 1864b. Recent. Queen Charlotte Islands to Gulf of California. (Pl. 12, figs. 6-16)

There was considerable juggling of names in connection with this genus, so that even though *C. scintillaeformis* was the specific name used in the first mention of *Cooperella*, the name was a *nomen nudum*. It had not at the time been described. It was also the specific name used in the description of *Cooperella*. However, *C. subdiaphana* was the species with the first description of *Oedalia*, the description which precedes that of *Cooperella*. It seems best to maintain the designation of Dall, using the name *C. subdiaphana* for the species and for the type of the genus.

Besides the type species, a West Coast Recent and Pleistocene species, the genus is represented by one species from the upper Miocene (Yorktown) of Virginia and North Carolina (Dall, 1900, p. 1063); Gardner (1943, p. 119) and a species, *C. atlantica* Rehder (1943, p. 187) living at Peanut Island, Lake Worth, Florida.

#### *Cooperella subdiaphana* (Carpenter)

(Pl. 12, figs. 6-16)

*Oedalia* (*Cooperella*) *scintillaeformis* CARPENTER, 1864b, p. 611, 639; Reprint, 1872, p. 97, 125; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 6 *Cooperella*

*Oedalia subdiaphana* CARPENTER, 1864b, p. 639; Reprint, 1872, p. 125; 1865, Apr., Jour. de Conchyl., vol. 13, p. 134; Reprint, 1872, p. 302

*Oedalina* (*Cooperella*) *scintillaeformis* CARPENTER, 1866, California Acad. Sci., Proc., vol. III, p. 208; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 6

*Cooperella subdiaphana* (+ *scintillaeformis*) (Carpenter), DALL, 1903, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. V, p. 1062; ARNOLD, 1903, p. 153, pl. XIII, fig. 1; DALL, 1921, p. 45; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 51; 1924b, p. 163; KEEN, 1937, p. 19; HAAS, 1942, Nautilus, vol. 55, no. 4, p. 110, 113; BURCH, 1944, no. 42, p. 20; 1945, no. 45, p. 16; SMITH and GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 175

"*Oedalia* (*Cooperella*) *scintillaeformis*, n. subg., n.s. S. Diego, Santa Barbara Is." [Carpenter, 1864b, p. 611]

"*Ocdalia subdiaphana*, n.g., n.s. Thin, swollen, shape of *Kellia*, ligament surrounding beaks; hinge with 5 bifid teeth (3-2); no laterals; large mantlebed." [Carpenter, 1864b, p. 639]

"*Cooperella scintillaeformis*, n.s. New subgenus of *Ocdalia*. Cartilage semi-internal: only 1 tooth bifid." [Carpenter, 1864b, p. 639]

"*Oe. t. albida*, tenuissima, subdiaphana, submargaritacea, tumente; laevi, striulis incrementi exillimis; epidermide pallide straminea, tenuissima, induta; suborbiculari, umbonibus tumetibus, prominentibus; marginibus omnino satis excurvatis, antico rotundato, postico paululum porrecto, lunula nulla: intus, valva sinistrali dentibus cardinalibus 3 bifidis, radiantibus, quorum centralis major, valva dextra 2 bifidis, intercalantibus; nymphis parvis, curtis, tenuibus; ligamento circa umbones excurrente; lamina cardinali dorsali parum claviculata; cicatricibus adductoribus parvis, marginem dorsalem versus sitis, antica ovali, postica subrotundata; sinu pallii regulariter ovali, per duas trientes interstitii incurrente, longitudinaliter tenuissime corrugato; linea pallii antice a margine remota, diagonaliter reflexa.—Long. .52, lat. .44, alt. .26, poll.

"*Hab.* San Diego, Cassidy.

"Je n'ai vu qu'un seul échantillon de cette coquille fort remarquable. Après l'avoir examinée pour la seconde fois et avec beaucoup de soin au microscope, pour caractériser l'espèce et pour comparer ses caractères avec ceux du *Cooperella scintillaeformis*, j'ai eu le malheur de le laisser tomber à terre et de le briser; mais je puis attester l'exactitude de la description. Cette espèce a l'aspect externe d'un *Kellia suborbicularis*; l'inflexion palléale d'un *Semele*; le ligament circumumbonal des *Circe* et des *Psephis*; et une charnière très complexe, contenant cinq dents, toutes bifides. Avec le sous-genre *Cooperella*, qui en diffère comme les *Lutricola* et les *Macoma* (le cartilage étant semi-interne) et peut-être avec les *Cycladella*, elle constitue un groupe particulier des *Tellinidae*." [Carpenter, 1865g, p. 134, *Oe. subdiaphana*]

"*C. t. tenuissima*, subdiaphana, latiore; forma "*Scintillacummingii*" simulante; extus argenteo-iridescente, striulis incrementi exillimis interdum undata; parte postica paulum majore rotundata; intus, valva dextra dent ii. laminatis, arcuatim divergentibus, extantibus, quorum anticus major, ventraliter sulcatus; v. sinistr. iii., quorum ant. et post. laminati, arcuati, centralis triangularis, bifidus fossa cartilaginea parva, semi-interna, sub umbones angustiores, satis prominentes, sita; lamina ligamentali nulla, nymphis longioribus; sinu pallii oblongo, lato; linea pallii antice minus declivi.

"Long. 0.60, lat. 0.48, alt. 0.32.

"*Hab.* San Diego; San Pedro, 2 dredged in 8-20 fms. *Cooper.*" [Carpenter, 1866a, p. 208, *C. scintillaeformis*]

The types of both *C. subdiaphana* and *C. scintillaeformis* are preserved in the U. S. National Museum. The holotype of *C. subdiaphana* is broken. It is labeled "smashed type. San Diego Cassidy no. 3563." There are many fragments, but the hinge of each valve is intact, and each is figured herein. The fracture of the type dates to Carpenter, for he wrote of his misfortune in regard to the shell.

The syntypes of *C. scintillaeformis* consist of two double specimens and a single valve. Illustrations of the doubles, as well as enlarged figures of the hinges of each, are included herein.

*Syntypes*.—U. S. National Museum, no. 15669 (*C. scintillaeformis*); no. 3563 (*C. subdiaphana* holotype)

*Distribution*.—Recent. San Diego, California (type); San Pedro, California (*C. scintillaeformis* type); Queen Charlotte Island, British Columbia, to Gulf of California (Dall) See Table 2 for stratigraphic distribution.

#### Family TELLINIDAE

#### Genus *Tellina* Linnaeus, 1758

*Tellina* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 674

Type species by subsequent designation, SCHMIDT, 1818, p. 51, 177. *T. radiata* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 675 for *Tellina* LAMARCK, type designation, CHILDREN, 1823, Quart. Jour. Sci., vol. XIV, p. 305; Reprint, 1931, p. 8; *T. radiata* LINNAEUS for *Tellina* LAMARCK, 1801 not 1799. Recent. South Carolina to the West Indies and Texas. REEVE, 1866, Conch., vol. 17, *Tellina*, pl. III, fig. 8a, 8b; MAXWELL SMITH, East Coast Marine Shells, 1937, pl. 23, fig. 3; ABBOTT, 1954, pl. 40c

#### Subgenus *Oudardia* Monterosato, 1884

*Oudardia* MONTEROSATO, 1884, Nomen. Gen. Spec. Conch. Med., p. 22

Type species by original designation, *Tellina oudardi* PAYRAUDEAU, 1826, Moll. Corse, p. 40,

pl. 1, figs. 16-18 plus = *T. compressa* BROCCHI, 1814, Conch. foss. Subapp., p. 514, pl. 12, fig. 9, *vide* MONTEROSATO, 1884, Nomen. Gen. Spec. Conch. Med., p. 22. Recent. Mediterranean. HANLEY in SOWERBY, [1846], 1847, Thes. Conch., vol. I, p. 297, pl. LXXVI, fig. 262 original description and figure of type

***Tellina (Oudardia) modesta* (Carpenter)**

(Pl. 13, figs. 4-9)

*Angulus modestus* CARPENTER, 1864b, p. 602, 639, 681; Reprint, 1872, p. 88, 125, 167; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 56

*Mera modesta* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 5

*Tellina (Angulus) modesta* (Carpenter), TYRON, 1869, Cat. Tellinidae, Acad. Nat. Sci., Philadelphia, p. 94

*Tellina (Angulus) modestus* (Carpenter), DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 304; 1921, p. 45; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 51; 1924b, p. 167; GRANT AND GALE, 1931, p. 361 section *Angulus*

*Tellina (Oudardia) modesta* (Carpenter), KEEN, 1937, p. 26; BURCH, 1943, no. 25, p. 12; 1945, no. 43, p. 7

*Tellina modesta* (Carpenter), ABBOTT, 1954, p. 425, pl. 31u

"*Angulus modestus*, n.s., but closely allied to the eastern *A. tener*, Say. Two sp. living." [Carpenter, 1864b, p. 602]

"*Angulus modestus*, n.s. (Subg. of *Tellina*.) Like *tener*, Say., but with callus between mantle-bend and scar. White." [Carpenter, 1864b, p. 639]

Carpenter's (1865) description was reprinted by Oldroyd in 1924. The following typographical errors should be corrected in Oldroyd's copy: line 1 of description, read *callositate* for *callosultate*; line 6, insert *ventrali* between *marginē* and *subplanata*; line 7, read *valva* for *va*; *va*; line 8, read *nullis* for *nullii*; read *callositatem* for *callosutatem*; line 9, read *paullum* for *paulum*. The following should be included to complete the copy of Carpenter's description:

"*Hab.* In sinu Pugetiano, specimina duo juniora legit Kennerley." [Carpenter, 1865e, p. 56]

The type material consists of two valves, now broken.

*Syntypes*.—U. S. National Museum, no. 4245

*Distribution*.—Recent. Puget Sound, Washington (type); Vancouver Island, British Columbia, to Lower California (Dall). See Table 2 for stratigraphic distribution.

***Tellina (Oudardia) buttoni* Dall**

(Pl. 13, figs. 10, 11)

*Angulus* ? var. *obtusus* CARPENTER, 1864b, p. 639; Reprint, 1872, p. 125

*Angulus modestus*, var. *obtusus* CARPENTER, 1865, Acad. Nat. Sci.

Philadelphia, Proc., vol. 17, p. 56. Not *Tellina obtusa* SOWERBY, 1817, Min. Conch., vol. 2, p. 175, pl. 179

*Mera obtusa* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 5

*Tellina (Oudardia) Buttoni* DALL, 1900, Nov., U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 304, 320, pl. IV, figs. 12, 13 new name for *T. obtusa* (Carpenter); 1900, Dec., Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. V, p. 1036, pl. 47, fig. 18; 1921, p. 46; OLDROYD, 1924b, p. 167, pl. 44, figs. 7a, 7b same figures as PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, pl. 25, figs. 7a, 7b; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. V, p. 51, pl. 41, figs. 7a, 7b; KEEN, 1937, p. 26; BURCH, 1943, no. 25, p. 13; 1945, no. 43, p. 7; no. 46, back page

*Tellina (Angulus) buttoni* Dall, ARNOLD, 1903, p. 157, pl. XVI, figs. 1, 2

*Tellina buttoni* Dall, PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 275, pl. 25, figs. 7a, 7b; GRANT AND GALE, 1931, p. 361 section *Oudardia*, see for additional synonymy

"*Angulus* ? var. *obtusus*. Inside like *modestus*; but beaks obtuse." [Carpenter, 1864b, p. 639]

"A. t. '*A. modesto*' simili; sed majore, umbonibus obtusis, vix donaciformi, marginibus dorsalibus et ventrali excurvatis; candidiore, vix diaphana; epidermide pallidissime straminea. Long. .72, lat. .44, alt. .15.

"*Hab.*—In sinu Pugetiano legit Kennerley; apud 'Neeah Bay,' Swan; prope S. Pedro, Cooper." [Carpenter, 1865e, p. 56]

Details of the shell have been described by Dall (1900a; 1900c). Dall gave the new name to replace the preoccupied one of Carpenter. Carpenter's material therefore should remain

the foundation for the original conception of the species. It does not seem wise to follow Dall in defining new types for the species when Carpenter's were in existence and available to Dall. (See discussion in the introduction to this paper on the practice of choosing new types for species renamed.) In the case of this species Dall did not choose a type for his new name from the type locality of Carpenter's species. Hence there is a double opportunity for misidentifying the original species. The remaining types of "*A.*" *obtusus* Carpenter are those mentioned second by Carpenter from San Pedro. Dall chose a Lower California shell for the holotype.

Interpreting the renaming of "*A.*" *obtusus* as strictly a nomenclatural technicality, the writer retains Carpenter's types<sup>41</sup> for the species as renamed, and the writer disregards Dall's 1900 redesignation.

In the case of a name merely replacing a preoccupied term, if the original types have been lost neotypes would properly be designated. In such case it would seem fitting that they should be from the original locality of the species. (See Copenhagen Decisions on Zool. Nomen., Aug. 1953, p. 28-32.)

This species has coarser concentric striae than *T. carpenteri* Dall (*T. variegata* Carpenter).

The double specimen (type no. 19429) has the valves intact. The valves were not separated for photographing, lest the hinges be broken. The photographs do not include that of the hinge.

*Syntypes*.—U. S. National Museum, no. 19429 (one double and fragments of two single valves)

*Distribution*.—Recent. San Pedro, California (Cooper, type); Lituya Bay, Alaska, to the Gulf of California (Dall). Pleistocene. (See Grant and Gale, 1931)

#### Subgenus *Moerella* Fischer, 1887

*Moerella* FISCHER, 1887, *Man. de Conchyl.*, p. 1147. *Moera* H. AND A. ADAMS, [1856] 1858, not *Macra* LEACH, 1814, *Donacilla* GRAY, 1851, not LAMARCK, 1819, see NEAVE, 1939-1940 for references

Type species by monotypy, *Tellina donacina* LINNAEUS, 1758, *Syst. Nat.*, 10th ed., p. 676. Recent. Europe. REEVE, 1866, *Conch. Icon.*, vol. 17, *Tellina*, pl. X, fig. 43; BUCQUOY, DAUTZENBERG, AND DOLLFUS, *Moll. Marins du Roussillon*, 1898, tome II, pl. 91, figs. 13, 14, vars. figs. 15-19

#### *Tellina* (*Moerella*) *carpenteri* Dall

(Pl. 13, fig. 12-16)

*Angulus variegatus* CARPENTER, 1864b, Aug., p. 611, 627, 639; Reprint, 1872, p. 97, 113, 125; 1864b, Dec., *Ann. Mag. Nat. Hist.*, ser. 3, vol. XIV, p. 423; Reprint, 1872, p. 235. Not

*Tellina variegata* GMELIN, 1791, *Syst. Nat.*, p. 3237

*Moera variegata* (Carpenter), COOPER, 1867, *Geog. Cat. Moll.*, Geol. Sur. California, p. 5

*Tellina* (*Angulus*) *variegata* (Carpenter), TRYON, 1869, *Cat. Tellinidae*, Acad. Nat. Sci. Philadelphia, p. 95

*Tellina* (*Angulus*) *carpenteri* DALL, 1900, U. S. Nat. Mus., *Proc.*, vol. 23, no. 1210, p. 303, 320 new name; 1908, *Mus. Comp. Zool.*, *Bull.*, vol. XLIII, no. 6, p. 421; 1921, p. 45; OLDROYD, 1924b, p. 166, not pl. 44, figs. 10a, 10b same as PACKARD, 1918, *Univ. California Pub. Zool.*, vol. 14, no. 2, pl. 25, figs. 10a, 10b, pl. 29, fig. 2; OLDROYD, 1924, *Pub. Puget Sound Biol. Station*, vol. 4, p. 51, not pl. 41, figs. 10a, 10b; KEEN, 1937, p. 26; BURCH, 1943, no. 25, p. 12; 1945, no. 43, p. 5, 7; no. 46, back page

Not *Tellina carpenteri* Dall, PACKARD, 1918, *Univ. California Pub. Zool.*, vol. 14, p. 276, pl. 25, figs. 10a, 10b, pl. 46; OLDROYD, 1924b, pl. 44, figs. 10a, 10b; OLDROYD, 1924, *Pub. Puget Sound Biol. Station* vol. 4, pl. 41, figs. 10a, 10b same as PACKARD pl. 25, figs. 10a, 10b = *T. (Moerella) arenica* HERTLEIN and STRONG, 1949, *Zoologica*, New York Zool. Soc., vol. 34, pt. 2, p. 68

"*Angulus variegatus*, n.s. Mont., *Cat. Is.*, 20-60 fm.; rare. (Neeah Bay, *Swan*.) [Carpenter 1864b, p. 611]

"*Angulus variegatus*, n.s. Shape of *obtusus*: no callus, rayed with pink and yellow. 20-60 fm. r. *Cp.*" [Carpenter, 1864b, Aug., p. 639]

<sup>41</sup> New types designated by Dall (1900c, p. 320) U. S. National Museum, no. 42865a, have been copied by later authors (Oldroyd; Grant and Gale)

Oldroyd gave a copy<sup>42</sup> of Carpenter's description (1864b, Dec.), and it will therefore not be repeated here. To her copy should be added:

"*Hab.* Neeah Bay (*Swan*); Monterey and Catalina Island, 20-60 fathoms, rare (Cooper)." [Carpenter, 1864b, Dec., p. 423]

The type material in the U. S. National Museum consists of one double and one single valve with the label bearing both Catalina Island and Neah Bay, with no means of co-ordinating either specimen with its proper locality. Since the two localities are widely separated, a decision based on choosing a lectotype from the syntypes and identifying the locality as near as possible with topotypes from either of the two localities would seem to be a means of solving a technical dilemma. The decision may have to be arbitrary, but it will be necessary to furnish a definite type locality. The lack of topotypes prevents such a selection in the present study.

*Syntypes*.—U. S. National Museum, no. 15467 (one double and one single left valve)

*Distribution*.—Recent. Type locality, either Neah Bay, Washington, or Catalina Island, California; Forrester Island, Alaska, to Panama (Dall) Pleistocene (See Grant and Gale, 1931.)

*Tellina* (*Moerella*) *meropsis* Dall

*Angulus Gouldii* CARPENTER, 1864b, p. 639, 665; Reprint, 1872, p. 125, 151; 1865, Jour. de Conchyl., vol. XIII, ser. 3, p. 132; Reprint, 1872, p. 300

Not *Tellina gouldii* HANLEY, 1846, in SOWERBY, Thes. Conch., vol. I, p. 272, pl. LVI, fig. 26. West Indies

*Tellina* (*Moerella*) *meropsis* DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 303, 317, pl. 3, fig. 1; 1921, p. 45

Carpenter overlooked Hanley's description of *Tellina gouldii*, a western Atlantic to Mexico species, and utilized the name for a west American form. Dall renamed the West Coast species and described it from a holotype from San Diego, California. The species ranges to the Gulf of California.

*Tellina* (*Moerella*) *salmonea* (Carpenter)

(Pl. 13, figs. 17-19)

*Maera salmonea* CARPENTER, 1864b, Aug., p. 627, 639; Reprint, 1872, p. 113, 125; 1864b, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV p. 423; Reprint, 1872, p. 235; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 5; KEEP, 1887, West Coast Shells, p. 196

*Tellina salmonea* (Carpenter), REEVE, 1867, Conch. Icon., vol. 17, *Tellina*, pl. XXIX, fig. 155

*Tellina* (*Moera*) *salmonea* Carpenter, TRYON, 1869, Cat. Tellinidae, Acad. Nat. Sci. Philadelphia, p. 88

*Tellina* (*Moerella*) *salmonea* (Carpenter), DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 302; cf. ARNOLD, 1903, p. 157, pl. XIII, fig. 7; DALL, 1921, p. 45; OLDROYD, 1924b, p. 165, pl. 44, fig. 3a, 3b same as PACKARD, 1918, Univ. California Pub. Zool., vol. 14, pl. 25, figs. 3a, 3b; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 51, pl. 41, figs. 3a, 3b same as PACKARD, 1918, Univ. California Pub. Zool., vol. 14, pl. 25, figs. 3a, 3b; BAILY, 1935, West Coast Shells (Keep), p. 99; BURCH, 1943, no. 25, p. 11; 1945, no. 43, p. 6; no. 46, back page

*Tellina salmonea* (Carpenter), PACKARD, 1918, Univ. California Pub. Zool., vol. 14, p. 276, pl. 25, figs. 3a, 3b; pl. 46; GRANT AND GALE, 1931, p. 359, section *Moerella*, see for additional synonymy; KEEN, 1937, p. 26; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 175

*Tellina* (*Peronidia*) *salmonea* (Carpenter) OINOMIKADO, 1934, Chikyū, vol. 22, no. 4, p. 37-39 text fig.

*Angulus* (*Peronidia*) *salmonea* (Carpenter), OTUKA, 1935, Bull. Earthquake Research Institute, Tokyo Imperial Univ., vol. XIII, pt. 4, p. 898, Miocene—Recent, northern Japan

*Tellina salmonea* (Carpenter), KEEN, 1941, 6th Pacific Sci. Cong., vol. 3, p. 480 no comment; ABBOTT, 1954, p. 426, pl. 31y

"*Maera salmonea*, n.s. (Scarcely differs from *Angulus*.) Small, subquadrate, glossy, salmon-tinted. Beach—20 fm. Cp." [Carpenter, 1864b, p. 639]

"M. testa parva, solida, compacta, subquadrata; laevi, nitente, epidermide tenui cinerea induta; extus pallide, intus vivide salmoneo tincta; marginibus doralibus rectis, ad angulum

<sup>42</sup> In the Oldroyd copy (1924), line 4, read *regulariter* for *regularites*.

120° separatis, umbonibus haud extantibus; marginibus antico et ventrali regulariter late excurvatis; parte postica brevissima, haud angulata: intus dent. card. utraque valva ii., quorum unus bifidus; lateralibus v. dextr. aequidistantibus, ant. extante, post. parvo; nymphis rectis, haud conspicuis: cicatr. add. post. subrotundata, ant. subrhomboida; sinu pallii satis regulariter ovali, per IV, inter v. partes interstitii porrecto. Long. .57, lat. .45, alt. .11 poll. "Variat testa aurantiaca, rarius albida, rosaceo tincta.

"Hab. San Francisco (Pac. Rail. E. E.); Neeah Bay (Swan), plentiful; Monterey, 20 fathoms (Cooper).

"In shape almost close to *Macoma crassula*, Desh. (Arctic); but that species is thinner, not glossy or salmon-coloured, and has no lateral teeth." [Carpenter, 1864b, Dec., p. 423]

The specimens in the U. S. National Museum which were segregated with the Carpenter types may not be the true types. They have a label "P.P.C." "Vancouver and Neeah Bay, W.T.J.G. Swan." In the case of Carpenter authentic types, the original label includes the word "type." These specimens (two double specimens and two single left valves) would be proper specimens from which to designate a neotype, since the original types have not been found. The fact that the specimens bear Carpenter's initials, and they are Swan's material, would identify the suite as original and proper specimens from which to choose a neotype. A great deal of Swan material identified by Carpenter was distributed by the Smithsonian Institution to other museums.

*Dimensions*.—Specimens U. S. National Museum, no. 73449. Length 14 mm., height 10 mm., thickness (double) 5 mm.; length 14 mm., height 11 mm., thickness (double) 5 mm.; length 9 mm., height thickness (single) 1+ mm. (each), respectively.

*Specimens*.—U. S. National Museum, no. 73449. Specimen figured herein (pl. 9, figs. 17–19).

*Distribution*.—Recent, Neah Bay, Washington, Vancouver Island region (type). Aleutian Islands to San Pedro, California (Dall). Gulf of California (Lowe in Burch, 1945, no. 46 back page). Pleistocene. Miocene (See Grant and Gale, 1931.)

#### Subgenus *Merisca* Dall, 1900

*Merisca* DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, p. 290

Type species by original designation, *Tellina crystallina* WOOD, 1815, Gen. Conch., p. 149, *fdc* Dall; WOOD, 1828, Index Test., pl. 3, fig. 10a. Recent. South Carolina to West Indies. Lower California to Quayaquil. MAXWELL SMITH, 1937, East Coast Marine Shells, pl. 19, figs. 8a, 8b; 1944, Panamic Marine Shells, no. 834 (fig.)

The species is *Tellina crystallina* Spengler (1795). See Hertlein and Strong (1955, p. 198).

#### *Tellina (Merisca) lamellata* Carpenter

*Tellina lamellata* CARPENTER, 1857, Mazatlan Cat., p. 37

*Arcopagia lamellata* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 6

*Tellina (Arcopagia) lamellata* Carpenter, DALL, 1921, p. 45 section *Merisca*

*Tellina (Merisca) lamellata* Carpenter, BURCH, 1945, no. 43, p. 6; no. 45, p. 16

*T. lamellata* was described by Carpenter from Mazatlan. The holotype should be in the British Museum (Natural History), and the figuring of it belongs with illustrations of the Mazatlan Catalogue. Dall recorded the species from Mazatlan to San Diego, California. The synonymy is not intended to be complete.

#### Genus *Apolymetis* Salisbury, 1929<sup>43</sup>

*Apolymetis* SALISBURY, 1929, Malacol. Soc. London, Proc., vol. 18, pt. VI, p. 258 for *Polymetis*; p. 255 for *Metis* H. AND A. ADAMS, 1856, Gen. Rec. Moll., vol. II, p. 399. Not *Metis* PHILIPPI, 1843, nor GISTL, 1848; not *Polymetis* WALSINGHAM, 1908, for references see NEAVE (1939–1940)

<sup>43</sup> In regard to *Capsa* Bruguière, 1797, see Deshayes, 1830, p. 191. Schmidt (1818, p. 56) did not designate *P. deflorata* Linn. as type of *Capsa* Bruguière. He merely cited the species. Schmidt did designate *P. deflorata* as type of *Capsa* Lamarck. For *Capsa* Bruguière 1797, see Dodge (1947a, p. 488, *nomen nudum*).



Type species by monotypy (for *Metis* H. AND A. ADAMS, 1856) *Tellina meyeri* DUNKER, PHILIPPI, 1846, Abbild. Beschrieb. Conchyl., vol. 2 *Tellina*, p. 89, pl. 4, fig. 1. Recent. East Indies. REEVE, 1867, Conch. Icon., vol. 17, *Tellina* pl. XXX, fig. 167 (*T. meyeri*)

***Apolymetis biangulata* (Carpenter)**

(Pl. 14, fig. 5)

- Tellina alta* CONRAD, 1837, Acad. Nat. Sci. Philadelphia, Jour., vol. 7, p. 258; HANLEY, 1847, in SOWERBY, Thes. Conch., vol. I, p. 322, pl. LXII, fig. 200; CARPENTER, 1856, Zool. Soc. London, Proc., p. 213; REEVE, 1867, Conch. Icon., vol. 17, *Tellina*, pl. XXVI, fig. 140. Not *Tellina alta* CONRAD, 1833, Fossil Shells Tert. Form., vol. 1, no. 4, p. 41; HARRIS Reprint, 1893, p. 67, Gosport sand Eocene
- Scrobicularia biangulata* CARPENTER, 1855, Zool. Soc. London, Proc., pt. XXIII, p. 230; 1856, Zool. Soc. London, Proc., pt. XXIV, p. 213; 1864b, p. 526; Reprint, 1872, p. 12
- Scrobicularia biangularis* CARPENTER, 1857, Rept. British Assoc. Adv. Sci., 1856, p. 303 error for *biangulata*
- Lutricola alta* (Conrad), CARPENTER, 1864b, p. 536, 595, 639— Reprint, 1872, p. 22, 81, 125, *L. alba*, p. 639 error for *alta*, repeated in SALISBURY, 1934, Malacol. Soc. London, Proc., vol. 21, pt. II, p. 76 error and name *nomen nudum*, therefore reference of no importance; CARPENTER, 1865, Jour. Conchyl., vol. XIII, ser. 3, vol. V, p. 133; Reprint, 1872, p. 301; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 6
- Metis alta* (Conrad), TRYON, 1869, Cat. Tellinidae, Acad. Nat. Sci. Philadelphia, p. 105; DALL, 1900, U. S. Nat. Mus., Proc., vol. XXIII, no. 1210, p. 306; 1900, Wagner Inst. Sci., Philadelphia, Trans., vol. III, pt. V, p. 1044; ARNOLD, 1903, p. 160; DALL, 1921, p. 46; OLDROYD, 1924b, p. 169, pl. 57, fig. 3
- Metis biangulata* Carpenter, TRYON, 1867, Cat. Tellinidae, Acad. Nat. Sci. Philadelphia, p. 105
- Apolymetis biangulata* (Carpenter), GRANT AND GALE, 1931, p. 363 see for additional synonymy; WILLETT, 1937, San Diego Soc. Nat. Hist., Trans., vol. VIII, no. 30, p. 390; BURCH, 1943, no. 25, p. 16 synonymy, fig. p. 24; 1945, no. 43, p. 9; 1945, no. 45, p. 16, no. 46, back page; 1946, no. 59, pl. XXI, fig. 65; DURHAM, 1950, Geol. Soc. Amer., Mem. 43, p. 89, pl. 24, fig. 1; pl. 25, fig. 12; FINCH, 1953, California Fish Game Marine Fish., Fish Bull., no. 90, p. 72, fig. 38

Oldroyd published a copy of Conrad's original description. As has been pointed out by several authors Conrad's name is preoccupied by his own earlier naming. The next name available is that of Carpenter (1855, p. 230); hence the inclusion of the species in this report.

"? *S. t. suborbiculari, subaequilatirali, convexiuscula, striis concentricis vix regularibus, postice undata, angulis duobus subobsoletis; ligamento externo tenuissimo, in sulcos alte impresso, semi-interne sito; ligamento interno fossa trigonali scalena sito, alteri adjacente; dentibus cardinalibus in utraque valva duobus, contiguis, vix radiantibus; cicatricibus muscularibus subovalibus, sinu pallii maximo; alba, intus aureo tincta.*

"Long. 1.5, lat. 1.78, alt. .8 poll.

"Hab. Sta. Barbara; legit T. Nuttall, Esp. Museo suo.

"Differs from *S. producta* in form and texture, and also in the comparative size of the external ligament, which in this species is situated in a semi-internal furrow." [Carpenter, 1855, p. 230, *S. biangulata*]

"*Tellina alta* = [(from types) ? *Scrobicularia biangulata*, Cpr.]" [Carpenter, 1864b, p. 526]

Unfortunately the type of *Tellina alta* (H. A. Pilsbry, September 30, 1948, personal communication) is not extant. Information concerning the holotype of *A. biangulata* was furnished by G. L. Wilkins (March 2, 1951, and July 10, 1951, personal communication), and the photograph of the specimen was provided by the officials of the British Museum (Natural History).

*Holotype*.—British Museum (Natural History), 61.5.20.117

*Distribution*.—Recent. Near Santa Barbara, California (*A. alta* (Conrad) type); Santa Barbara, California (*A. biangulata* (Carpenter), type); Point Conception, California, to San Quintin, Lower California (Finch). Pleistocene. Pliocene. Miocene. (See Grant and Gale, 1931.)

**Genus *Macoma* Leach, 1819**

*Macoma* LEACH in ROSS, 1819, Voyage H.M.S. Isabella and Alexander Discovery Baffin's Bay, 1st ed., app. II, p. LXII

Type species by monotypy *Macoma tenera* LEACH in ROSS, 1819, Voyage H.M.S. Isabella Discovery Baffin's Bay, 1st ed., app. II, p. LXII = *Tellina calcarca* GMELIN, 1791, Syst. Nat., 13 ed., pt. VI, p. 3236. Recent. Arctic to Japan and Alaska, Pacific Ocean; Long Island Sound, Atlantic Ocean. OLDROYD, 1924, pl. 42, fig. 5. For synonymy, see GRANT AND GALE, 1931, p. 369

*Distribution of genus.*—Eocene—Recent: Eocene—Recent, Western Hemisphere; Miocene—Recent, Europe

#### *Macoma expansa* Carpenter

(Pl. 13, figs. 1-3)

*Macoma* ? var. *expansa* CARPENTER, 1864b, p. 602, 639; Reprint, 1872, p. 88, 125; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 56; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 5

*Macoma expansa* Carpenter, TRYON, 1869, Cat. Tellinidae, Acad. Nat. Sci. Philadelphia, p. 101; DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 308; 1900, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. V, p. 1052; 1921, p. 48; OLDROYD, 1924b, p. 176; KEEN, 1937, p. 22; BURCH, 1943, no. 25, p. 21; 1945, no. 43, p. 15; 1945, no. 45, p. 17

"*Macoma* (? v.) *expansa*. Adult broken; young living. Belongs to a group of forms classed together by some writers under *lata* or *proxima*, but the characters of the hinge and mantle-bend have not yet been sufficiently studied." [Carpenter, 1864b, p. 602]

"*Macoma* ? var. *expansa* Scars like *lata* and *calcarca* in Mus. Cum., but teeth not bifid, very thin, glossy. Scarcely differs from *lata*, Desh. in B. M. Greenland." [Carpenter, 1864b, p. 639]

The description of 1865 was republished by Oldroyd (1924, p. 177). To the portion reprinted should be added the remaining part of Carpenter's description as follows:

"*Hab.*—In sinu Pugetiano raissime legit Kennerley.

"A. '*M. lata*, Gmel.' Desh. MS. in Mus. Brit. vix differt, specimine Groenlandico; sed *M. latae* et *calcarae* in Mus. Cumingiano textura et dentibus haud convenit. Species quaedam hujusce formae, extus similiores, intus dentibus et sinu pallii satis differunt." [Carpenter, 1865e, p. 56]

Dall (1900, p. 308) regarded the type material mixed as to specific identity. The species has been doubted by authors since Dall.

The specimens, two different valves, marked types in the U. S. National Museum, bear the label "Types. Dr. Kennerly. Puget Sound." This label coincides with Carpenter's original statement as to locality (1864b, p. 602, 639).

If Dall doubted what the characters of the species were, it does not seem logical to maintain, until the identity of the species is known, the extent of distribution as given by Dall. Arnold (1903, p. 161) furnished the information that specimens in the State Collection at the University of California labelled "*M. expansa*" were *M. calcarca* Gmelin.

Burch (1943, p. 21) stated that the species is "unknown to any member of the Conchological Club of Southern California." Considering that the type has never been figured and only general information is available concerning the shell, it is not surprising that the form is not known.

The hinge and unbonal area of the smaller specimen, a left valve, are broken. The right valve is figured herein.

*Type.*—U. S. National Museum, no. 3910, two valves

*Distribution.*—Puget Sound, Washington (Kennerley, type)

#### *Macoma yoldiformis* Carpenter

(Pl. 14, figs. 2-4)

*Macoma yoldiformis* CARPENTER, 1864b, p. 602, 611, 639; Reprint, 1872, p. 88, 97, 125; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 55; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 5; TRYON, 1869, Cat. Tellinidae, Acad. Nat. Sci. Philadelphia, p. 104; DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 309; ARNOLD, 1903, p. 165, pl. XVI, fig. 6; PACKARD, 1918, Univ. California, Pub. Zoology, vol. 14, p. 280, pl. 25, fig. 6; DALL, 1921, p. 48; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 54, pl. 41, fig. 6 same as PACKARD, 1918, pl. 25, fig. 6; OLDROYD, 1924b, p. 177, pl. 44, fig. 6 same as PACKARD, 1918, pl. 25, fig. 6; GRANT AND GALE, 1931, p. 373; KEEN, 1937, p. 22; BURCH, 1943, no. 25, p. 22, fig.; 1945, no. 43, p. 15; 1945, no. 45, p. 17; no. 46, back page

"*Macoma yoldiformis*, n.s. one valve." [Carpenter, 1864b, p. 602 Vancouver district]

"*Macoma yoldiformis*, S. Diego. (Puget Sound, *Kennerley*.)" [Carpenter, 1864b, p. 611]

"*Macoma yoldiformis*, n.s. Small, white, glossy, very transverse; ligament-area scooped-out." [Carpenter, 1864b, p. 639]

To the republished Carpenter description of 1865 in Oldroyd (1924, p. 176) the following should be added:

"*Hab.* In Pacifico Boreali primum piscavit Belcher: dein valvas duas in sinu Pugetiano Kennerley: postea prope San Diegonem, Cooper: rarissime." [Carpenter, 1865e, p. 55]

The "holotype" consists of one left valve labelled, "Type. Neeah Bay, J. G. Swan." On the back of the label the inscription "also 14842-15587 San Pedro, Cooper. (Puget Sound)" is given.

Kennerley is stipulated as the collector of the original Puget Sound specimen mentioned by Carpenter. Since the present marked type has "J. G. Swan,"<sup>44</sup> it is apparent that the Swan specimen is not the individual specified in the original description.

Inasmuch as the present "type" is from the general type locality and no other specimen labelled "type" has been preserved, the specimen in the U. S. National Museum would be appropriate to be designated as a neotype.

*Specimen figured.*—U. S. National Museum, no. 4507

*Distribution.*—Recent. Puget Sound, Washington, to San Diego, California (Dall). Pliocene-Miocene. California (See Grant and Gale, 1931, p. 373) Pleistocene. Mexico (Jordan, 1926; Hertlein, 1934)

#### Subgenus *Rexithaerus* Conrad in Tryon, 1869

*Rexithaerus* CONRAD in TRYON, 1869, Cat. Tellinidae, Acad. Nat. Sci. Philadelphia, p. 104, pub. also suppl. Amer. Jour. Conch., vol. 4, pt. 5, 1869; DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 292, as "? section".

Type species by subsequent designation, DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 292, *Macoma secta* CONRAD, 1837, Acad. Nat. Sci. Philadelphia, Jour. ser. 1, vol. VII, p. 257. Living. Vancouver Island to Gulf of California. OLDROYD, 1924, pl. 44, fig. 8

*Distribution of subgenus.*—Miocene—Recent. West Coast

#### *Macoma* (*Rexithaerus*) *indentata* Carpenter

(Pl. 16, figs. 1, 2)

*Macoma indentata* CARPENTER, 1864b, p. 611, 639; Reprint, 1872, p. 97, 125; 1866, California Acad. Sci., Proc., vol. III, p. 208; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 5; TRYON, 1869, Cat. Tellinidae, Acad. Nat. Sci. Philadelphia, p. 102; DALL, 1900, U. S. Nat. Mus., Proc., vol. 23, no. 1210, p. 309 section *Rexithaerus*; DALL, 1900, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. V, p. 1053 section *Rexithaerus*; ARNOLD, 1903, p. 161, pl. XVI, fig. 1; PACKARD, 1918, Univ. California Pub. Zoology, vol. 14, p. 277, pl. 25, fig. 4; DALL, 1921, p. 48 section *Rexithaerus*; OLDROYD, 1924, Pub. Puget Sound Station, vol. 4, p. 55, pl. 41, fig. 4; 1924b, p. 178, pl. 44, fig. 4 same figure as in PACKARD, 1918, pl. 25, fig. 4; GRANT AND GALE, 1931, p. 374 section *Rexithaerus*; KEEN, 1937, p. 22; BURCH, 1943, no. 25, p. 23, fig. section *Rexithaerus*; 1945, no. 43, p. 15; 1945, no. 45, p. 17; no. 46, back page

*Macoma (indentata* Carpenter, var. ?) *tenuirostris* DALL, 1900, U. S. Nat. Mus., Proc., vol. XXIII, no. 1210, p. 309, 324; 1921, p. 48; OLDROYD, 1924b, p. 178

"*Macoma indentata*, n.s. S. Diego." [Carpenter, 1864b, p. 611]

"*Macoma indentata*, n.s. Like *secta*, jun., but beaked, indented, and ventrally produced." [Carpenter, 1864b, p. 639]

"State Collection, no. 365.

"M. t. 'M. sectae' simili; sed postice valde rostrata, sinu inter plicam et regionem ventralem valde expansam indentata.

"Long. 2.20, lat. 1.40, alt. 0.56.

"*Hab.* San Pedro, (young, living, *Palmer*;) large dead valves, *Cooper*."

<sup>44</sup> Mr. J. G. Swan and the Indian children of Neah Bay, Washington, collected a large number of shells which were sent to the Smithsonian Institution. Many of Carpenter's types were from those collections. Duplicates were freely distributed to other organizations where the specimens are still available bearing the Smithsonian label with J. G. Swan as collector. (See Carpenter, 1864b, p. 626; Reprint, 1872, p. 112, 235.)

"Differs from *M. umbonella*, Lam., in its *secta*-like postligamental wing. This being rubbed off in the large dead valves, the shell has the aspect of a very distinct species." [Carpenter, 1866, p. 208]

The holotype consists of a right valve collected in a dead but well-preserved condition. The specimen is labelled "Cotype San Pedro, Cooper." The shell and label may thus be identified as that of Carpenter's description of 1865. There is only the one specimen at present.

Dall described the "variety" *tenuirostris* of this species (1900, p. 309, 324). On the back of the label of the type of *M. indentata* is written "var. *tenuirostris* Dall." Dall (1900, p. 324) stated, "For the rostrate form, pending the acquisition of more and fresh material, I would propose the varietal name of *tenuirostris*. It measures long. 55, alt. 33, and diam. 16 mm." Those dimensions are the same (approximately of height and diameter) of the specimen no. 15229, which is the type of *M. indentata*, as indicated in the U. S. National Museum collections. The other specimens which Carpenter mentioned are not now available so that the specimen which Dall thought differed varietally from the typical is the lone type of the species. Willett (*in* Burch, 1945, no. 43, p. 16) doubted the validity of Dall's subspecies.

Specimens in some collections labelled this species are higher and more rounded anteriorly than the holotype. This may be the difference which Dall accounted for.

*Holotype*.—U. S. National Museum, no. 15229

*Distribution*.—Recent. San Pedro, California (type); Puget Sound, Washington, to Lower California (Dall). Pleistocene, Pliocene, Miocene. (See Grant and Gale, 1931, p. 374, 375.)

Etherington (1931, p. 85, pl. 10, figs. 3, 4) described a subspecies of this species from the Astoria formation, middle Miocene, of western Washington.

#### Family SEMELIDAE

#### Genus *Semele* Schumacher, 1817

*Semele* SCHUMACHER, 1817, *Essais Nouv. Syst.*, p. 165

Type species by original designation, *Tellina reticulata* SPENGLER<sup>45</sup> = *T. proficua* PULTENEY, 1799, *Hutchins Hist. Dorsetshire*, p. 29, pl. V, fig. 4. Recent. Eastern United States, Virginia to West Indies. L. PERRY, 1940, *Bull. Amer. Paleont.*, vol. 26, no. 95, pl. 16, fig. 103; L. PERRY AND SCHWENGEL, 1955, *Marine Shells of Western Coast of Florida*, pl. 16, fig. 103, same figure as in Perry

#### *Semele incongrua* Carpenter

(Pl. 14, figs. 7-10)

*Semele incongrua* CARPENTER, 1864b, p. 611, 640; Reprint, 1872, p. 97, 126; 1866 [date from page], Feb., *California Acad. Sci., Proc.*, vol. III, p. 208; COOPER, 1867, *Geog. Cat. Moll., Geol. Sur. California*, p. 6; TRYON, 1869, *Cat. Tellinidae, Acad. Nat. Sci., Philadelphia*, p. 120; DALL, 1915, *Acad. Nat. Sci. Philadelphia, Proc.*, vol. 67, p. 27; 1921, p. 49; OLDROYD, 1924, p. 181, pl. 11, figs. 12, 13; GRANT AND GALE, 1931, p. 377; KEEN, 1937, p. 25; BURCH, 1945, no. 43, p. 18; 1945, no. 45, p. 17; HERTLEIN AND STRONG, 1949, *Zoologica, New York Zool. Soc.*, vol. 34, pt. 4, p. 248

"*Semele incongrua*, n.s. Catalina Is., 40-60 fm.; common." [Carpenter, 1864b, p. 611]

"*Semele incongrua*, n.s. Like *pulchra*, with concentric sculpture differing in r. and l. valves: fine radiating striae all over. 40-60 fm. c. *Cp.*" [Carpenter, 1864b, p. 640]

A copy of the original description is given in Oldroyd. To complete the copy the following should be added:

"*Hab.* Santa Barbara, 16 fm. 1 valve; Catalina Island, 40-60 fm., not uncommon; Cooper." [Carpenter, 1866, p. 208]

Line 3, correct "raditim" to read "radiatim."

Oldroyd, followed by Grant and Gale, gave the type as in the California State Collection, no. 1061. Such information is merely the original number as stated by Carpenter and does not indicate the present whereabouts of the specimens. To date the type has not been found.

<sup>45</sup> Skrtft. Nat. Selsk, vol. 4, H. 2, p. 115. Complete reference is not at present available or verified.

There is in the Redpath Museum a Carpenter glass mount with 7 specimens (2 pairs) of *Scmcle incongrua*. Besides the specific name the mount bears a Carpenter label of "Catalina Is. 40-60 fm. Cooper." This material would be appropriate from which to choose a lectotype for the species.

The interior of the shell of the above specimens is pinkish, particularly at the hinge. The surface of the shell has coarse concentric lines which are coarser on the right valve. The concentric ribs are wider apart on the posterior end. They divide at the umbonal line and extend as two ribs over the remainder of the surface. Radiating microscopic lines are developed between the concentric ribs. There is a suggestion of brownish or pinkish rays over the exterior. One of the double specimens (broken) measures 17 mm. in length. Another specimen measures 18 mm. in length and 13 mm. in height.

A subspecies of this species from the Pleistocene of Deadman Island, San Pedro Harbor, was described by Arnold.<sup>46</sup>

In April, 1953, William K. Emerson of the Museum of Paleontology at the University of California sent to the writer 10 (2 doubles) specimens (no. 2389) of *S. incongrua* Carpenter from Santa Catalina Island which were marked as Cooper Collection. There are no other original marks on the label or specimen which identify any of the specimens as type or syntypes. One of the specimens is not *Scmcle* but a *Tellina*. The remaining 9 fall into the same category as that of the McGill specimens. In the University of California suite is 1 double which has about the measurements of Carpenter's original dimensions, 0.58 long (14.74 mm.)  $\times$  .40 lat. (10.16 mm.). The writer includes an illustration of that shell (pl. 14, figs. 7-10). The cardinal hinge area and interior umbonal region are rose-tinted as originally described. There are three larger specimens, two right valves 24 mm. and 23 mm. length each, and a left valve, 20 mm. length. The whole interior of the largest specimen is rosy and rosy pink. The others are white or pinkish.

*Measurements, specimen figured*.—Length, 14.25 + mm.; height, 10 + mm.; right valve. Length, 14 mm.; height, 9 + mm., left valve

*Type*.—Not found

*Specimen figured*—no. 33453, Museum of Paleontology, University of California

*Distribution*.—Catalina Island, California (type); Monterey, California, to the Coronado Islands, California (Dall). See Table 2 for stratigraphic distribution.

#### Family GARIDAE

##### Genus *Gari* Schumacher, 1817

(*Psammobia* Lamarck, 1818, An. s. Vert., p. 511)

*Gari* SCHUMACHER, 1817, Essais Nouv. Syst. Habit. Vers Test., p. 44, 131, pl. IX, fig. 2; STEWART, 1930, Acad. Nat. Sci. Philadelphia, Sp. Pub. no. 3, p. 280

Type species by tautonymy *Gari vulgaris* Schumacher = *Tellina gari* Schumacher not Linnaeus = *T. faeroensis* or *T. feroensis* = *T. fervensis* GMELIN, 1791, p. 3235. Recent. Northern Europe. SCHUMACHER, 1817, Essais Nouv. Syst. Habit. Vers Test., pl. IX, fig. 2 hinge; BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1895, Moll. Marins du Roussillon, t. 2, pl. 70, figs. 10-16

##### Subgenus *Gobraeus* Leach in Gray, 1852

*Gobraeus* LEACH, ms. name in BROWN, 1844, Recent Conch. Great Britain and Ireland, 2d ed., p. 102 in synonymy of *Psammobia vespertina* Lamarck, GRAY, 1852, Moll. Brit. Synopsis, p. 265

Type species by monotypy *G. variabilis* Leach = *Solen vespertinus* GMELIN, 1791, Syst. Nat., 13 ed., pt. VI, p. 3228. Recent. British Isles. BROWN, 1844, Recent Conch. Great Britain and Ireland, 2d ed., pl. XI, fig. 3; FORBES AND HANLEY, 1848, Hist. British Moll., vol. I, pl. XIX, figs. 1, 2

The use (Bucquoy, Dautzenberg, and Dollfus, 1895; Sacco, 1901; Makiyama, 1934; Habe, 1952; Abbott, 1954) of *Psammocola* Blainville, 1824, for *Gobraeus* Leach in Gray, 1852, is not verified by the record.

<sup>46</sup> *S. incongrua montereyi* Arnold, 1903, p. 166, pl. 15, figs. 3, 3a (not 4, 4a). Described as *S. pulchra montereyi* by Arnold.

Blainville (1824, p. 349) inaugurated *Psammocola* with three sections, with an example under each. *Psammocola vespertinalis* ("E.M. [Ency. Method.] pl. 231, f. 3, abc" [no "c" on plate]) was given under section "A". Blainville (1825, p. 567) repeated the original description with specific reference but in addition to the same reference (E.M. [Ency. Method.] pl. 231, fig. 3 abc) he added another figure (pl. LXXVII, fig. 4). The two figures do not represent the same species. Bucquoy, Dautzenberg, and Dollfus (1895, p. 485) made the type designation for the genus, "*P. vespertinalis* Blainville (= *vespertina* = *depressa*"). This type designation was repeated by Sacco (1901, p. 10). The Sacco designation has been used by Makiyama (1934, p. 154) and Habe (1952, p. 203). However, that of Bucquoy, Dautzenberg, and Dollfus (1895) has priority.

The type designation of *P. vespertina* is not valid for the species *P. vespertinalis* Blainville, as typified by the only original reference given, and is not the same as *P. vespertina* (Gmelin). The second reference (1825) as illustrated does represent *P. vespertina* (Gmelin) (Chemnitz, 1784, pl. 7, figs. 59, 60), but that species was an after thought of Blainville and hence does not enter into the original description. Reeve (1856, pl. I) pointed out that Blainville's figure (1824, pl. 231 under caption "Capsa") represented a species like *Venus deflorata* Linn. (see *Capsa* in Reeve, 1856, pl. I). That observation is true. The species figured (Bruguière, 1797) 3, a b, pl. 231, Ency. Meth. is sculptured with coarse radiating ribs and is not the same species as Blainville figured later (1825, pl. LXXVII, fig. 4).

*Psammocola* Blainville, 1824, must stand on the original figure, and the name of Blainville, 1824, preoccupies Blainville, 1825. Hence the type designations of Bucquoy, Dautzenberg, and Dollfus (1895) and Sacco (1901) are not valid. Bucquoy, Dautzenberg, and Dollfus in the synonymy of *P. vespertina* (Gmelin) [= *P. depressa* (Pennant)] (1895, p. 485) did not include the *P. vespertinalis* Blainville, 1824, but gave "*P. vespertinalis*" Blainville, 1825 [in part], pl. LXXVII, fig. 4. This is indirect evidence that they did not regard the first reference as equivalent to *P. vespertina* (Gmelin).

### Gari (Gobreaeus) californica (Conrad)

*Psammobia rubroradiata* Nuttall ms., Carpenter

(Pl. 16, figs. 3-5, 7)

"*Psammobia rubroradiata* Nuttall ms. in Carpenter." described by Carpenter, in 1865, determined by Dall in 1898 as equivalent to *P. californica* CONRAD, 1848 [1849], Acad. Nat. Sci. Philadelphia, Proc., vol. 4, p. 121 not described, name for CONRAD, 1837, Acad. Nat. Sci. Philadelphia, Jour., vol. VII, pl. 19, fig. 3

*Sanquinolaria rubro-radiata* "Conrad," CARPENTER, 1856, Zool. Soc. London, Proc., pt. XXIV, p. 212 not described, California; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 195, Nuttall ms. not described, California; 1860, Smith, Misc. Coll., vol. 2, art. 6, p. 1 name only

*Psammobia rubroradiata* "Nuttall," CARPENTER, 1864b, p. 540, Monterey, California; p. 563 Puget Sound, p. 602 Vancouver dist., p. 638 Puget Sound; Vancouver Island, San Diego; Reprint, 1872, p. 26, 49, 88, 124 (*rubro-radiata*); 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 55 "Nutt. MS. described"; "Conrad," COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 5; "Nutt.," WILLIAMSON, 1898, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 185

*Gari (Psammacola) rubrolineata* Nuttall, Carpenter, TRYON, 1867. Cat. Family Tellinidae, Acad. Nat. Sci. Philadelphia, p. 77 error for *rubroradiata*

*Psammobia californica* Conrad, DALL, 1898, Acad. Nat. Sci. Philadelphia, Proc., vol. 50, p. 61 *vide* DALL; WEYMOUTH, 1920, California Fish Game Comm., Fish Bull. no. 4, pl. 14, fig. 1

*Psammobia (Gobreaeus) californica* Conrad, DALL, 1921, p. 49; in part OLDROYD, 1924b, p. 185, pl. 43, fig. 5 copy of Conrad's type figure

*Gari (Gobreaeus) californica* (Conrad), GRANT AND GALE, 1931, p. 382 in part, which see for additional synonymy of *G. californica* (Conrad).

The first mention which Carpenter made to "*Psammobia rubroradiata*" (as *Sanquinolaria*) was as of Conrad from the Nuttall Collection from California. The vicissitudes of the publication of the Nuttall Collection of molluscan species is explained in detail by Carpenter

(1857b, p. 192–202). By 1864 he realized that Conrad had not used Nuttall's name in description. Also in 1864 Carpenter began to include Puget Sound-Vancouver Island specimens in the distribution of the species, for he then identified the species from Dr. Kennerley's and J. G. Swan's material. If the meagre lines of description of the species (1864b, p. 638) by Carpenter should constitute description the type locality could be either in Washington or California.

When Carpenter fully described the species (1865c) the material that from his description would qualify as type material was that of Dr. Kennerley from the Puget Sound region (see title of paper).

The above analysis is pertinent to establish a lectotype for the name Carpenter used for this species and hence verify its identity with that of the species previously named by Conrad.

Early material of the Carpenter species so far discovered are two specimens in the British Museum (Natural History), Mollusca Section (G. L. Wilkins, June 16, and July 10, 1950, personal communication) labelled *Psammobia rubroradiata* Nuttall from California, in the Cuming Collection with an ancient notation "Neiah Bay" on the back of the tablet bearing the shells. Mr. Wilkins wrote,

"I have further examined the two shells labelled *rubroradiata* and have come to the conclusion that there are two species on the tablet, the largest of which has pinkish radiations on the outside of the shell, inside pure white and came from the Cuming coll.

"There seems little doubt therefore that the shell was sent to Cuming by Nuttall or Jay with the manuscript label which is now attached to the back of the tablet, with the locality 'Neiah Bay.'"

The Neah Bay label might identify one of the specimens from the Swan collection, for that is the material Carpenter referred to in 1864. Swan and the Indian children were the chief collectors of material which Carpenter worked on from Neah Bay, Washington. There could be a mixture of labels and specimens, and material from both areas could have been grouped together.

G. L. Wilkins wrote (March 2, 1951 and July 10, 1951 personal communication) that certain specimens of the Nuttall Collection were available and included "*Sanguinolaria rubroradiata* Conrad." This shell was one of a lot purchased by the British Museum in 1861 from Nuttall's executors. The specimen, of which a photograph is included, has on the front of the tablet which bears the specimen, "*Sanquinolaria rubroradiata* Conr. Coll. Nuttall." On the back is the following, "*Sanquinolaria rubroradiata* Conr. I doubt whether this is the rubror of Conr. V his figure. It is at any rate = *Psammobia lilacina* Cpr. MSS. U. Cal. P.P.C." [pencilled note by Cpr. and initialled by his monogram].

The enlarged photographs included here (pl. 16, figs. 3–5) were made through the courtesy of the British Museum. The writer chose one specimen as the lectotype of *P. rubroradiata* Carpenter. It is conspecific with *Gari californica* (Conrad).

*Lectotype*.—British Museum (Natural History), 61.5.20.88

*Distribution*.—California (type). Same as *P. californica* Conrad.

### *Gari* (*Gobraeus*) *regularis* (Carpenter)

(Pl. 15, figs. 1–6)

*Psammobia* (? *Amphichaena*) *regularis* CARPENTER, 1864b, p. 618; Reprint, 1872, p. 104; 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 312; Reprint, 1872, p. 210; TRYON, 1869, Catalogue Family Tellinidae, Philadelphia, p. 78

*Psammobia* (*Gobraeus*) *regularis* (Carpenter), DALL, 1898, Acad. Nat. Sci. Philadelphia, Proc., vol. 50, p. 57; DALL, 1921, p. 49; OLDROYD, 1924, p. 184

*Gari* (*Gobraeus*) *regularis* (Carpenter), KEEN, 1937, p. 20; BURCH, 1945, no. 43, p. 21; 1945, no. 45, p. 17

A copy of the original description of this species is given in Oldroyd. The species was described from Cape St. Lucas. Dall (1921) extended the range to San Diego, California.

Burch does not report the species from the coast of the State of California. The type is figured in this report because of the possible extension into the California fauna.

*Holotype*.—U. S. National Museum, no. 19407 (one double shell)

*Distribution*.—Cape St. Lucas, Lower California, Xantus ("*legit.*") (type); San Diego, California, to Cape St. Lucas, Lower California (Dall).

#### Genus *Tagelus* Gray, 1847

*Tagelus* GRAY, 1847, Zool. Soc. London, Proc., pt. XV, p. 189

Type species by original designation *Solen guineensis* GRAY, 1847, Zool. Soc. London, Proc., pt. XV, p. 189 = *S. gibbus* SPENGLER, 1794, Skrift. Nat. Selsk., vol. III, pt. 2, p. 104 *vide* GARDNER, 1943. Recent. Guinea, West Coast Africa. SOWERBY *in* REEVE, 1874, Conch. Icon., vol. 19, *Solen*, pl. IV, fig. 15 *S. Guineensis*. *T. gibbus* (Spengler) as of Dall is included from the Yorktown Miocene of Virginia, Pliocene-Pleistocene East Coast and Florida, and living Cape Cod to Brazil by Gardner (1943)

#### *Tagelus politus* Carpenter

*Solecurtus politus* CARPENTER, 1857, Cat. Mazatlan Shells, p. 27

*Tagelus politus* (Carpenter), DALL, 1898, Acad. Nat. Sci. Philadelphia, Proc., vol. 50, p. 59 section *Mcsopleura*; KEEN, 1937, p. 26; BURCH, 1945, no. 43, p. 23; 1945, no. 45, p. 18

*Tagelus californianus* Conrad, SMITH, 1944, Panamic Marine Shells, p. 64 *T. politus* considered young of *T. californianus* Conrad

This species was described from Mazatlan by Carpenter. The type should be, therefore, in the Mazatlan Collection at the British Museum (Natural History). The illustration of the type would be properly with the figuring of that collection. The species is included herein because the range of the species has been described as extending north to the Santa Barbara region (Keen, 1937). Burch (1945, no. 43, p. 23) enumerated the problems involved in the questionable identifications of the species.

#### Family SOLENIDAE

#### Genus *Solen* Linnaeus, 1758

*Solen* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 672

Type species by subsequent designation, CHILDREN,<sup>47</sup> 1822, Quart. Jour. Sci., vol. XIV, p. 83, pl. 4, fig. 26; Reprint, 1931, p. 5, *S. vagina* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 672 in part.

Bucquoy, Dautzenberg, and Dollfus (1893, fasc. XXII, p. 498) pointed out that the *Solen vagina* of Linnaeus was a mixture of a European species (later named *S. marginatus* Pennant, 1774) and an Indian species. The Linnaean reference in Rumphius is to a shell abruptly truncated anteriorly and rounded posteriorly. Authors such as Wood (1835, p. 210), although calling the European form *S. vagina*, admitted that the Linnaean references are to the Indian form [*S. vagina* Linn.]. Recent. East Indies. Sowerby *in* Reeve, 1874, Conch. Icon., vol. 19, *Solen*, pl. II, fig. 6 as *S. brevis* Gray. (Habitat probably not American as given.)

#### *Solen rosaceus* Carpenter

*Solen* ? *sicarius*, var *rosaceus*, CARPENTER, 1864b, p. 536, 638; Reprint, 1872, p. 22, 124; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 177; Reprint, 1872, p. 279

*Solen rosaceus* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 5; 1888, 7th Ann. Rept. California State Min. Bur., p. 265; DALL, 1899, U. S. Nat. Mus., Proc., vol. 22, no. 1185, p. 108; 1900, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. V, p. 952; ARNOLD, 1903, p. 171; WEYMOUTH, 1920, California Fish Game Com., Fish Bull., no. 4, p. 50, pl. 15, fig. 3; DALL, 1921, p. 50; OLDRYD, 1924b, p. 188 not pl. 49, fig. 6; GRANT and GALE, 1931, p. 386 see for additional synonymy; KEEN, 1937, p. 25; BURCH, 1945, no. 43, p. 27; 1945, no. 45, p. 18; FINCH, 1953, California Fish Game Marine Fish., Fish Bull., no. 90, p. 76, fig. 42

<sup>47</sup> The reference to Schmacher given by authors as type designator is not valid. Although no designation was made, a single species, *S. vagina* Linn., was listed, so that the generic status remains the same as in the case of the Children designation.



"*Solen* ? var *rosaceus*. Straight, narrower, longer, smaller, glossy, rosy." [Carpenter, 1864b, p. 638]

"*S. testa* *S. sicario* simili, sed minore; multo augustiore, elongata, recta, extus et intus rosacea; epidermide tenui, valde nitente. Long. .27, lat. .5, alt. .32 poll.

"*Hab.* Sta. Barbara (*Jewett*); S. Pedro (*Cooper*)." [Carpenter 1865h, p. 177]

The type of this species has not been found. It was never figured, and Weymouth (1920) and Finch (1953) seem to be the only ones who have presented a figure of the species. The type is not in the British Museum (Natural History) (G. L. Wilkins, May 22, 1950, personal communication) as stated by Oldroyd.

Through the kindness of William K. Emerson of the Museum of Paleontology at the University of California, a specimen of *Solen rosaceus* loc. "no. 42" from their early collections was examined and photographed. This specimen was a fossil embedded in fine hardened sand probably lower Pleistocene. The original description described the species as "glossy, rosy" and "epidermide tenui"; therefore, the types would have to have been Recent shells. Because the specimen which was photographed by Emerson could not be a type, the illustration is not included herein.

*Types*.—Not found

*Distribution*.—Recent. Santa Barbara or San Pedro, California (type); Humboldt Bay, California, to Mazatlan, Gulf of California (Finch). Pleistocene. Pliocene. Miocene. (See Grant and Gale, 1931.)

#### Family MACTRIDAE

#### Genus *Darina* Gray, 1853

*Darina* GRAY, 1853, Ann. Mag. Nat. Hist., ser. 2, vol. 11, p. 42

Type species by monotypy *D. solenoides* [King], 1831, Zool. Jour., vol. V, p. 335 as *Erycina*.

Recent. Straits of Magellan. GRAY, GRIFFITH AND PIDGION (CUVIER), 1834, Animal Kingdom, pl. 22, fig. 1 as *Mesodesma*; H. AND A. ADAMS, 1858, Gen. Rec. Moll., III, pl. CI, fig. 2, 2a; LAMY, 1914, Jour. de Conchyl., vol. LXII, p. 28, 29, fig. of hinge

#### *Darina declivis* Carpenter

(Pl. 14, figs. 1, 1A)

*Darina declivis* CARPENTER, 1864b, p. 607, 637; Reprint, 1872, p. 93, 123; 1865, Feb. 14, Zool. Soc. London, Proc. 1865, p. 203; Reprint, 1872, p. 251; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 4; DALL, 1894, Nautilus, vol. 8, no. 4, p. 42, 43; 1898, Wagner Free Inst. Sci., Philadelphia, Trans., vol. III, pt. IV, p. 890; 1902, U. S. Nat. Mus., Proc., vol. 26, no. 1312, p. 408

"*D. t. tenuissima*, planata, elliptica, Machaeraeformi, utroque latere hiant; cinerea, epidermide fortiore induta; marginibus regulariter excurvatis; umbonibus haud conspicuis, ad duas inter quinque partes longitudinis postice sitis: intus cartilagine spathula elongata, dorsum versus utraque valva decliviter sita, a ligamento lamina extante tenuissima separata; dente cardinali laminato, extante, curtiore; lateralibus vix conspicuis; sinu pallii ovali, fere ad medium porrecto.

"Long. 1.77, lat. .85, alt. .34 poll.

"*Hab.* Vancouver's Island (*Forbes*).

"The only other species of *Darina* known is from the Straits of Maghellan [*sic*]. The northern shell may have been passed over as the young of *Machaera patula*, to which it bears a strong external resemblance." [Carpenter, 1865a, p. 203]

The holotype of this species consists of one double specimen in the Redpath Museum at McGill University. The specimen is mounted on an original Carpenter glass mount with a Carpenter label of "(unique type) Vancouver Dr. Forbes."

There is no doubt of the authenticity of the holotype, but there is uncertainty as to the proper locality of the shell.

Carpenter brought out the fact of the unique distribution of the species but did not question that the shell came from Vancouver. The species has not been reported from the Northwest since the original citation, and Dall doubted the correctness of the original label. Now that the shell is illustrated perhaps collectors may note its proper locale.

*Holotype*.—Redpath Museum, no. 101

*Distribution*.—"Vancouver Isl.," British Columbia (type)

## Family MYACIDAE (Myidae)

Genus *Sphenia* Turton, 1822

*Sphenia* TURTON, 1822, Conch. insul. Brit., p. 36

Type species by subsequent designation, GRAY, 1847, Zool. Soc. London, Proc., p. 190, *S. Binghami* TURTON, 1822, Conch. insul. Brit., pl. 3, figs. 4, 5; pl. 19, fig. 3. Recent. British Isles

*Sphenia fragilis* Carpenter

*Sphaenia fragilis* CARPENTER, 1857, Cat. Mazatlan Shells, p. 24; DALL, 1921, p. 53; OLDROYD, 1924b, p. 200; BURCH, 1945, no. 44, p. 27; 1945, no. 45, p. 19

This species was described by Carpenter in his Mazatlan Catalogue. Since the illustration of the species properly belongs in that unit, a figure of the species has not been sought for this report. The type material consists of numerous specimens in the British Museum. Many specimens of the first duplicate set of this species are in the Mazatlan Collection in Albany, New York (Palmer, 1951, p. 13).

Dall (1921) reported the range of the species from Oregon to Mazatlan. Oldroyd (1924) stated that the distribution extended to Vancouver Island, but Keen (1937 and Burch (1945) agreed with Dall (1921) as to the northern range.

*Sphenia ovoidea* Carpenter

(Pl. 15, figs. 7-10)

*Sphaenia ovoidea* CARPENTER, 1864b, p. 602, 637; Reprint, 1872, p. 88, 123; 1865, Acad. Nat.

Sci. Philadelphia, Proc., vol. 17, p. 54 *Shacnia* [sic]; COOPER, 1867, Geog. Cat. Moll., Geol.

Sur. California, p. 4; TRYON, 1869, Cat. Corbulidae, Acad. Nat. Sci. Philadelphia, p. 67

*Sphenia ovoidea* Carpenter, DALL, 1921, p. 53; Oldroyd, 1924b, p. 200; KEEN, 1937, p. 25;

BURCH, 1945, no. 44, p. 27; 1945, no. 45, p. 19

"*Sphaenia ovoidea*, n.s. Siphonal area small; front excurved; mantle-bend large." [Carpenter, 1864b, p. 637]

A copy of the description (1865e) was given by Oldroyd. The following lines which complete that description should be added:

"*Hab.* In sinu Pugetiano specimen unicum piscavit Kennerley.

"A Sph. ? Binghami 'Searles Wood Crag, vix differt.' [Carpenter, 1865e, p. 54]

The holotype is mounted on the original Carpenter glass mount with Carpenter label, "Type 4552." No locality is on the glass, but the label with the specimen states, "Puget Sound Kennerly [sic]." There is an additional vial in the same box with fragments.

*Holotype*.—U. S. National Museum, no. 4552

*Distribution*.—Puget Sound, Washington (type); Aleutian Islands to Puget Sound, Washington, and San Diego, California (Dall). Although Oldroyd (1924a, p. 62) included *S. fragilis* Carpenter in the fauna of Puget Sound she did not mention *S. ovoidea* Carpenter, the type locality of which is that area.

## Family CORBULIDAE

Genus *Corbula* Bruguière, 1797<sup>48</sup>

(*Aloides* Mergerle von Mühlfeld, 1811)

*Corbula* BRUGUIÈRE, 1797, Tableau encyclopédique et méthodique des trois règnes de la nature, tome II [title page], liv. 62, pl. 230. Ruled as "indication" for purposes of Article 25, 1950, Bull. Zool. Nomen., vol. 4, pts. 10-12, p. 255

Type species by subsequent designation, SCHMIDT, 1818, Versuch. Einricht. Conchyl.-Samml., p. 77, 177, *Corbula sulcata* LAMARCK, 1801, Syst. An. sans Vert., p. 137 for *Corbula* LAMARCK, 1801 = BRUGUIÈRE, 1797; *C. sulcata* Lamarck, BRUGUIÈRE, 1797, pl. 230, fig. 1, a, b, c (not named). Recent. Senegal. REEVE, 1843, Conch. Icon., vol. 2, *Corbula*, pl. 1, fig. 2

<sup>48</sup> See Sherborn and Woodward (1906, p. 577-582) for correct dates of parts of Bruguière (1797)

For reference data of *Corbula*, see Gardner (1926, 1928), Stewart (1930), Winckworth (1930) Grant and Gale (1931), and Vokes (1945). The settlement as to author and type species is now based on decisions made by the International Commission on Zoological Nomenclature, 1948 (Bull. Zool. Nomen., vol. 4, pts. 7-9, p. 159-160, 346; pts. 10-12, p. 255, 1950).

*Corbula polychroma* Carpenter in Gould and Carpenter

*Corbula polychroma* CARPENTER in GOULD AND CARPENTER, 1856, Zool. Soc. London, Proc., pt. XXIV, p. 198; CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856, p. 226, 228, 300; 1864b, p. 534, 553; Reprint, 1872, p. 20, 39; 1863, Zool. Soc. London, Proc., p. 31; Reprint, 1872, p. 205

The specimens described under this name from the Cuming Collection and Jewett Collection were later identified by Carpenter (1863, p. 31; 1864b, p. 534, 553) as the same as *C. biradiata* Sowerby. Carpenter (1863, p. 31) corrected Jewett's locality label of "Santa Barbara," and suggested that the specimens probably came from "Panama or Acapulco." The name may be deleted from the list of specific names, and the record of an occurrence of such a *Corbula* from the upper California waters may be eliminated.

Subgenus *Lentidium* Cristofori and Jan, 1832

(*Corbulomya* Nyst, 1845)

*Lentidium* CRISTOFORI AND JAN, 1832, Catalogus, sect. 2, p. 8; Mantissa Test., p. 4. See VOKES, 1945, Amer. Mus. Nat. Hist., Bull., vol. 86, art. 1, p. 24

Type species by subsequent designation, DALL, 1898, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. IV, p. 838, *Lentidium maculatum* CRISTOFORI AND JAN = *Corbula mediterranea* COSTA, 1829, Cat. Test. Sicilie, p. XIV, pl. 1, fig. 6 a, b, c *vide* MONTEROSATO, 1884, Nomen. Gen. Spec. Conch. Medit., p. 30. Recent Mediterranean. VOKES, 1945, Amer. Mus. Nat. Hist., Bull., vol. 86, art. 1, pl. 4, figs. 23-27

The exact status of the genus (Vokes, 1945) or subgenus (Grant and Gale, 1931) is still indefinite, for there is doubt concerning the species of Cristofori and Jan. Vokes (1945, p. 23) made a new subfamily to include the genus. He figured the type species.

*Corbula (Lentidium) luteola* Carpenter

(Pl. 15, figs. 13-18)

*Corbula luteola* CARPENTER, 1864b, p. 611, 637; Reprint, 1872, p. 97, 123; 1866, California Acad. Sci., Proc., vol. III, pt. III, p. 207; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 4; TRYON, 1869, Cat. Corbulidae, Acad. Nat. Sci. Philadelphia, p. 65; KEEP, 1887, West Coast Shells, p. 204; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 236; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 183; ARNOLD, 1903, p. 181 in part, not pl. XVII, fig. 11; DALL, 1921, p. 53; OLDDROYD, 1924b, p. 203 also var. *rosea* WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 183.

*Corbula luteola rosea* WILLIAMSON, 1905, So. California Acad. Sci., Bull., vol. IV, pt. 8, p. 120. Not *C. rosea* LEACH in BROWN, 1844, Ill. Recent Conch. Great Britain and Ireland, 2d ed., p. 105

*Corbula (Lentidium) luteola* (Carpenter), GRANT AND GALE, 1931, p. 421, pl. 19, figs. 2, 7; BAILY, 1935, West Coast Shells, (Keep), p. 119; DURHAM, 1950, Geol. Soc. Amer., Mem. 43, p. 94, pl. 25, figs. 15, 16

*Aloides (Lentidium) luteola* (Carpenter), KEEN, 1937, p. 18; BURCH, 1945, no. 44, p. 28; 1945, no. 45, p. 19

"*Corbula luteola*, n.s. S. Pedro—S. Diego; common near shore." [Carpenter, 1864b, p. 611]

"*Corbula luteola*, n.s. Shape of young *biradiata*; small, ashy yellow. Com. Cp." [Carpenter, 1864b, p. 637]

The description by Carpenter of 1866 has been copied by Oldroyd, but by oversight she did not give the reference to the description. To the copy published by Oldroyd (1924) should be added the concluding line:

"*Hab.*—San Diego, San Pedro, 50, alive at low water." [Carpenter, 1866a, p. 207]

Line 3, read "definito" for "definato"

Carpenter listed the type material as "State Collection, no. 587." This number refers to

J. G. Cooper's collection for the State Geological Survey of California (1864e, p. 155). The type material in the U. S. National Museum consists of eight specimens which bear a label, "San Pedro, Cooper" and on the back of the label, "15668 Cp 581." The number appears to be Cp 581, but it probably should be "Cp 587," the original number published by Carpenter.

Arnold's (1903) figure does not represent this species. Perhaps the drawing was not well executed. At least it should not be used for identification.

*Syntypes*.—U. S. National Museum no. 14897 (eight valves)

*Distribution*.—Recent. San Pedro, California (type); Monterey, California, to Magdalena Bay, Lower California (Dall). Pleistocene, California (Cooper; Arnold; Grant and Gale; Willett, 1937); Mexico (Jordan, 1926; Hertlein, 1934); Lower California (Durham, 1950). Upper Miocene, California (Grant and Gale)

#### Family PHOLIDIDAE

##### Genus *Martesia* (Leach) Sowerby, 1824

*Martesia* mentioned by SOWERBY of LEACH, 1824, Genera Recent and Fossil Shells, pt. XXIII, *Pholas* no pagination; LEACH in DE BAINVILLE, 1825, Man. de Malacol., vol. 1, p. 632; STEWART, 1930, Acad. Nat. Sci. Philadelphia, Sp. Paper no. 3, p. 294

Type species by monotypy *Pholas clavata* LAMARCK, 1818, Hist. nat. An. sans Vert., V, p. 446 = *Pholas striata* [LINNAEUS], 1758, Syst. Nat., 10th ed., p. 669, Gualt. test. t. 105, fig. F. Recent. Western Atlantic, North Carolina to Brazil. Eastern Pacific, Mexico to Peru. Indo-Pacific. TURNER, 1955, Johnsonia, vol. 3, no. 34, p. 103, pls. 35, 61-64

##### *Martesia intercalata* Carpenter

*Martesia intercalata* CARPENTER, 1857, Mazatlan Cat., p. 13; 1864b, p. 628, 637, 665; Reprint, 1872, p. 114, 123, 151; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 3; DALL, 1921, p. 56; OLDROYD, 1924b, p. 214; KEEN, 1937, p. 22; BURCH, 1945, no. 44, p. 35; 1945, no. 45, p. 20; TURNER, 1955, Johnsonia, vol. 3, no. 34, p. 75, 122, pl. 72, figs. 1-2 type determined as synonymous with *Penitella conradi* VALENCIENNES, 1846, in ABEL DU PETIT-THOUARS, Voyage autour du Monde sur la Frégate La Vénus, Atlas de Zool., Moll., pl. 24, fig. 1

This species was originally described from the Reigen Mazatlan Collection but it was later reported from the Farallon Islands by Carpenter (1864b, p. 628, 637). The illustration of the type belongs in the work on the figuring of the Mazatlan Catalogue. Turner included in her monograph of the Pholididae, part II, an illustration of Carpenter's drawing of the type shells in Hanley's collection.

#### Class SCAPHIPODA

##### Family DENTALIIDAE

##### Genus *Dentalium* Linnaeus, 1758<sup>49</sup>

*Dentalium* LINNAEUS, 1758, Syst. Natura, 10th ed., p. 785

Type species by subsequent designation, MONTFORT, 1810, Conchyliol. Syst., t. 2, p. 23. *Dentalium elephantinum* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 785. Living. Amboyna and Philippine Islands. PILSBRY AND SHARP, 1897, Man. Conch., vol. XVII, pl. 1, figs. 1-7

##### Subgenus *Rhabdus* Pilsbry and Sharp, 1897

*Rhabdus* PILSBRY AND SHARP, 1897, Man. Conch., ser. I, vol. 17, p. 112

Type species by original designation, *D. rectius* CARPENTER, 1864b, p. 648; 1865e, p. 59. Recent. Alaska to Panama Bay, pl. 17, figs. 1, 2

##### *Dentalium (Rhabdus) rectius* Carpenter

(Pl. 17, figs. 1, 2)

*Dentalium rectius* CARPENTER, 1864b, p. 603, 648; Reprint, p. 89, 134; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 59; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 21; TAYLOR, 1895, Roy. Soc. Canada, Trans., ser. 2, vol. 1, sec. IV, p. 56; DALL, 1921, p. 57; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 68; 1927, pt. I, p. 11, pl. 1,

<sup>49</sup> *Dentalium* placed on official list of generic names, Sum. Opinion Rend., no. 94, Int. Rules Zool. Nomen., Smithsonian Misc. Coll., 1926, vol. 73, no. 4, p. 12; Schenk and McMasters, 1936, p. 53; Keen and Muller, 1948, p. 59; 1956, p. 59

fig. 3; GRANT AND GALE, 1931, p. 437; KEEN, 1937, p. 35; BURCH, 1945, no. 46, p. 9, 13, pl. 1, figs. 19, 21; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 178

*Dentalium (Rhabdus) rectius* (Carpenter), PILSBRY AND SHARP, 1897, Man. Conch., vol. XVII, p. 112, 113, pl. 21, fig. 45

"*Dentalium rectius*, n.s. Long, thin, slightly curved: like *eburncum*, Singapore." [Carpenter, 1864b, p. 648]

Carpenter's description (1865e) of this species and supplementary notes by Pilsbry and Sharp, were republished by Oldroyd (1927). To Oldroyd's copy the following lines should be added to complete the Carpenter description:

"*Hab.*—In sinu Pugetiano legit Kennerley.

"*Varina D. eburnco*, Singaporensi convenit; sed annulus falacibus caren, textura valde differt." [Carpenter, 1865e, p. 59]

*Holotype*.—U. S. National Museum, no. 5283

*Distribution*.—Puget Sound, Washington (type); Stephens Passage, Alaska, to Panama Bay (Dall). See Table 2 for stratigraphic distribution.

#### Family SIPHONODONTALIIDAE

#### Genus *Cadulus* Philippi, 1844

*Cadulus* PHILIPPI, 1844, Enum. Moll. Siciliae, vol. 2, app. 1, p. 208, pl. XXVII, fig. 21 [not pl. XVII as stated in Philippi]; PILSBRY AND SHARP, 1897–1898, Man. Conch., vol. XVII, p. 142, 156, pl. 32, figs. 40–41

Type species by monotypy, *Dentalium ovulum* PHILIPPI, 1844, Enum. Moll. Siciliae, vol. 2, app. 1, p. 209. Recent. Mediterranean and Bay of Biscay. Miocene and Pliocene of Italy

#### *Cadulus nitentior* Arnold

*Cadulus nitentior* CARPENTER ms.

*Cadulus nitentior* "Carpenter ms.," ARNOLD, 1903, p. 187, pl. VIII, fig. 15; ? BERRY, 1907, Nautilus, vol. 21, no. 2, p. 22; GRIPP, 1909, Nautilus, vol. 22, no. 12, p. 137, ms. name *fade Berry* (June 1950, personal communication) determination by Dall

"*Cadulus nitentior* CARPENTER, ms. in ARNOLD, 1903", PILSBRY, 1904, Nautilus, vol. 17, no. 9, p. 108 serpulid annelid

The name *Cadulus nitentior* has been used in literature as of Carpenter. The name, however, was a manuscript label of Carpenter which was used by Dall in determination of specimens (Berry, 1907; Gripp, 1909). Carpenter did not mention the species in his writings. There is a specimen in the Redpath Museum with a label, "*Cadulus nitentior* Cpr. MS. Catalina Isl. 30 fm." The label also has a printed form, "From the Smithsonian Institution, Washington, D. C." This specimen is a *Cadulus*.

The name has valid status from Arnold (1903), and authorship should be attributed to Arnold only. The holotype would be the specimen figured by Arnold (1903, pl. 8, fig. 15) from the Pleistocene, "Lower San Pedro series" [San Pedro sand], Deadman Island, California.

One specimen, U. S. National Museum (no. 23729) (Harald Rehder, U. S. National Museum, Aug. 2, 1950, personal communication) is labelled "*Cadulus nitentior* Carpenter MS. from 30 fathoms off Catalina Island, collected by Cooper," in Carpenter's handwriting. The entry in the U. S. National Museum catalogue was in 1871. This is probably the specimen with which Dall compared, and by which he identified material for correspondents. This specimen has no status in a type category, for Arnold in validating the specific name used a Pleistocene shell.

#### *Cadulus quadrifissatus* Pilsbry and Sharp

*Siphonodentalium 4-fissatum* CARPENTER, ms. "label in Smithsonian Institution Collection" PILSBRY AND SHARP, 1897, Man. Conch., vol. XVII, p. 151

*Cadulus quadrifissatus* (Carpenter), PILSBRY AND SHARP, 1897–1898, Man. Conch., vol. XVII, p. 150, pl. 29, figs. 10–13

Pilsbry and Sharp described this species from Henry Hemphill material collected at San Diego, California. They used Carpenter's manuscript name which Carpenter had attached to

material from San Pedro, collected by Cooper and deposited in the Smithsonian (U. S. National Museum, no. 19462).

As a courtesy to Carpenter, Pilsbry and Sharp credited the specific name to Carpenter. However, the name with Carpenter as author is a *nomen nudum*. The description and figures were first published by Pilsbry and Sharp who used the San Diego specimen in the Academy of Sciences of Philadelphia as the holotype.

The form is referred to here, not because of a Carpenter specific name or type but merely to present all pertinent data in connection with Carpenter names and clarify the status of the same. Synonymy is not intended to be complete.

Class GASTROPODA

Family FISSURELLIDAE

Genus *Puncturella* Lowe, 1827

*Puncturella* LOWE, 1827, Zool. Jour., vol. 3, p. 77, 78

Type species by original designation, *Patella noachina* LINNAEUS, 1771, Mantissa Plantarum, p. 551. Living. Franz Josef Land, Arctic Ocean, to northern England, from Norway to Spain; Greenland south to Cape Cod. FARFANTE, 1947, Johnsonia, vol. 2, no. 24, p. 138, pls. 60, 61

*Puncturella cooperi* Carpenter

(Pl. 18, figs. 16, 17)

*Puncturella Cooperi* CARPENTER, 1864b, p. 612, 651; Reprint, 1872, p. 98, 137; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 214; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 24; PILSBRY, 1890, Man. Conch., vol. XII, p. 231; PILSBRY AND JOHNSON, 1891, Nautilus, vol. 5, no. 8, p. 106; DALL, 1921, p. 186; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 183; 1927, vol. II, pt. III, p. 240; KEEN, 1937, p. 44; BURCH, 1946, no. 60, p. 29; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 61, pl. 29, fig. 1 Pleistocene; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXV, no. 8, p. 204

"Outside like *galeata*, but without props to the lamina. 30-120 fm. not r. *Cp.*" [Carpenter, 1864b, p. 651]

"—State Collection no. 1029.

"P. t. "*P. galeatae*," fere exacte simulante; sed lamina interna solida, planata, haud antica sinuata, haud suffulta.

"Long. 0.30, lat. 0.21, alt. 0.24, div. 70°.

"Hab. Catalina Island, not rare, 40 to 20 fms. *Cooper*, alive.

"Outside like *P. noachina*; but with the lamina like *P. cucullata*, without eye-holes. The latter species is extremely variable in sculpture, but never so fine as this; and the shape is less conical." [Carpenter, 1866a, p. 214]

The holotype is labelled "Type Catalina Is. Cal. Cooper." It has been heretofore unfigured.

*Holotype*.—U. S. National Museum, no. 11848

*Distribution*.—Recent. Catalina Island, California (type); Kasaän Bay, Alaska, to Santa Rosa Island, California (Dall), See Table 2 for stratigraphic distribution.

Genus *Diodora* Gray, 1821

(*Diadora* Gray, 1847)

*Diodora* GRAY, 1821, London Medical Repository, vol. XV, Mar. 1, p. 233; IREDALE, 1915, Malacol. Soc. London, Proc., vol. 11, p. 331

Type species by monotypy, *Patella apertura* MONTAGU, 1803, immature *Fissurella graeca auct.*, non LINNAEUS, 1767, 12 ed. p. 1262. Living. British Isles. MONTAGU, 1803, Testacea Britannica, vol. II, p. 491, pl. XIII, fig. 10; LOWE, 1827, Zool. Jour., vol. III, p. 77

*Diodora murina* (Arnold) 1903

*Fissurella* (*Glyphis*) *murina* "Cpr." DALL in ORCUTT, 1886, U. S. Nat. Mus., Proc., vol. 8, p. 543 *nomen nudum*

*Fissuridea murina* (Carpenter) Dall, WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 197 *nomen nudum*, see note by Dall concerning equivalence; ARNOLD, 1903, p. 339 de-

scribed; 1907, U. S. Nat. Mus., Proc., vol. 32, no. 1545, p. 545, pl. 50, figs. 3, 3a; 1907, U. S. Geol. Sur., Bull. 309, pl. 40, figs. 3, 3a

*Diadora murina* (Carpenter ms.) DALL, 1921, p. 185; OLDROYD, 1927, vol. II, pt. III, p. 237  
*Diadora murina* (Carpenter in Dall in Orcutt), GRANT AND GALE, 1931, p. 850  
*Diadora murina* (Arnold), BURCH, 1946, no. 60, p. 26

This species did not have a valid description until Arnold's in 1903, as pointed out by A. Myra Keen (in Burch).

The species is included herein for completeness as to Carpenter manuscript or valid scientific names. A full discussion of the form is not intended.

#### Genus *Lucapinella* Pilsbry, 1890

*Lucapinella* PILSBRY, 1890, Man. Conch., vol. XII, p. 179, 195

Type species by original designation, "*Clypidella callomarginata* Carpenter," [Dall] 1871, Amer. Jour. Conch., vol. VII, p. 133. Recent. Bodega Bay, California, to Magdalena Bay, Lower California (Dall). DALL, 1871, Amer. Jour. Conch., vol. VII, pl. 15, fig. 8;  
 PILSBRY, 1890, Man. Conch., vol. XII, pl. 44, figs. 3-5; pl. 61, figs. 1-5

#### *Lucapinella callomarginata* (Dall)

*Clypidella callomarginata* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 24; CARPENTER, ms. in DALL, 1871, Amer. Jour. Conch., vol. VII, p. 133, pl. 15, fig. 8  
 "*Chypidella*" [sic] *callomarginata*, p. 160 expl. plate; DALL in ORCUTT, 1885, U. S. Nat. Mus., Proc., vol. 8, p. 543; ARNOLD, 1903, p. 341

*Lucapinella callomarginata* (Dall), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 198; DALL, 1921, p. 185; OLDROYD, 1927, vol. II, pt. III, p. 244, pl. 85, fig. 6; KEEN, 1937, p. 38; GRANT AND GALE, 1931, p. 849; BURCH, 1946, no. 60, p. 25

*Lucapinella callomarginata* (Carpenter), PILSBRY, 1890, Man. Conch., vol. XII, p. 196, pl. 44, figs. 3-5; pl. 61, figs. 1-5; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 198; PILSBRY AND LOWE, 1932, Acad. Nat. Sci. Philadelphia, Proc., vol. LXXXIV, p. 128; SMITH, M., 1944, Panama Marine Shells, p. 3, fig. 19

This species was a manuscript name, used by Cooper (1867) and described by Dall. The holotype is in the U. S. National Museum and was figured by Dall (1871). Reference to the name is included herein to save confusion in regard to Carpenter names. The synonymy and discussion is not intended to be complete.

Isabel Perez Farfante (1946, p. 23, fig. 406) recorded the species from Mayaguez, Puerto Rico, Playo Maldonado, Uruguay, and Boca del Rio Negro, Argentina (specimens U. S. National Museum and Museum of Comparative Zoölogy).

#### Genus *Fissurella* Bruguière, 1789

#### *Fissurella volcano* Reeve

(Pl. 18, fig. 19)

"*Fissurella ornata* Nuttall MS." CARPENTER

*Fissurella volcano* REEVE, 1849, Conch. Icon., vol. 6, *Fissurella*, pl. IV, fig. 2; PILSBRY, 1890, Man. Conch., vol. XII, p. 156

*Fissurella ornata* Nuttall ms. in CARPENTER, 1856 [1857], Zool. Soc. London, Proc., pt. XXIV, p. 222 and var. *monstrosa*, p. 223; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 241, 319, 349; 1857, Mazatlan Cat., p. 214; 1864b, p. 527, 540, 651; Reprint, 1872, p. 13, 26, 137

Carpenter (1856e [1857]) utilized a manuscript name of Nuttall, *F. ornata*. In 1864 he considered that the form was synonymous with *F. volcano* Reeve, and workers have continued to assign it as *F. volcano* Reeve.

Through G. L. Wilkins a photograph of the Nuttall specimen in the British Museum was furnished by that institution. Wilkins sent the notes of the label, which is with the specimen. He questioned it as the type, but it is the only specimen available which might qualify. (See explanation pl. 18, fig. 19.)

## Family ACMAEIDAE

Genus *Acmaea*<sup>50</sup> Eschscholtz (1830), 1833

*Acmaea* Eschscholtz in Kotzebue, 1830, Neue Reise um die Welt in den Jahren 1823, 24, 25, und 26, Weimar, vol. 2, app., p. 24; English translation, 1830, A new voyage around the world, v. 2, app., p. 350, London, p. 350 genus without species; Eschscholtz in Rathke, 1833, Zool. Atlas,<sup>51</sup> pt. 5, p. 16 *vide* Woodring (1928, p. 458)

Type species by subsequent designation, Dall, 1871, Amer. Jour. Conch., vol. VI, p. 238, *Acmaea mitra* Eschscholtz in Rathke, p. 18, pl. 23, fig. 4 *vide* Philippi, 1846, p. 107. Recent. Pribilof Islands, Bering Sea, to San Martin Island, Lower California. Pilsbry, 1891, Man. Conch., vol. XIII, pl. 3, fig. 50

For discussion of West Coast species of this genus see Test (1946).

*Acmaea atrata* Carpenter

*Acmaea* (? var.) *atrata* CARPENTER, 1864, June, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 474; Reprint, 1872, p. 213; 1864b, Aug., p. 541, 618, 666; Reprint, 1872, p. 27, 104, 152; PILSBRY, 1891, Man. Conch., vol. XIII, p. 30, pl. 7, figs. 61-65 types; BURCH, 1946, no. 57, p. 15

*Collisella atrata* (Carpenter), DALL, 1871, Amer. Jour. Conch., vol. VI, p. 255, pl. 14, figs. 15, 15a

The three syntypes of this species are in the U. S. National Museum. They were figured by Pilsbry (1891). The type locality is Cape San Lucas; therefore, the details regarding the form are reserved for the report on the Carpenter types of that area. Burch (1946, no. 57, p. 15) recorded identifications of the species by Dall and Eyerdam in the California fauna. Test (1946) does not acknowledge the existence of the species on the California coast.

*Syntypes*.—U. S. National Museum, no. 4019

*Distribution*.—Cape San Lucas, Lower California (type); Santa Monica, San Pedro, California (Burch; Eyerdam, 1938; not in Test)

## "Acmaea [fenestrata] cribaria Carpenter"

*Acmaea patina cribaria* GOULD ms., CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856, 211, 319; 1864b, p. 530; Reprint, 1872, p. 16; 1866, Amer. Jour. Conch., vol. II, p. 335; PILSBRY, 1891, Man. Conch., vol. XIII, p. 12 under *A. patina*, synonym *A. fenestrata*.

*Acmaea scutum cribaria* Carpenter, DALL, 1921, p. 169; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 167; OLDROYD, 1927, vol. II, pt. III, p. 149

*Acmaea cribaria* Gld. ms. Carpenter, PILSBRY, 1921, Nautilus, vol. 36, p. 71 *nomen nudum*

*Acmaea cribaria* Carpenter, KEEN, 1937, p. 28

*Acmaea fenestrata cribaria* Carpenter, BURCH, 1946, no. 57, p. 5, 9, subgenus *Patelloidea*; SMITH AND GORDON, 1948, California Acad. Sci., Proc., 4th ser., vol. XXVI, p. 199

*Acmaea fenestrata cribaria* Gould, TEST, 1946, Cont. Lab. Vert. Biol. no. 31, p. 1

"*A. patina*, var. *d.*, is internally almost always dark in the spectrum, with white sides. But sometimes there are concentric zones of dark, alternating with the white, in which state it is the '*A. cribaria*.' Gld., ms., a very worn specimen of which was 'purchased at the Sandwich Islands' by the omnivorous naturalists of the United States Exploring Expedition. Sometimes the spectrum is well defined, nearly black; and the sides are dark brown. The intermediate forms and shades between the vars. *Cumingii* and *patadina* are very common. Sometimes the marginal edge grows light, with a dark belt inside; or the dark becomes more or less spotted." [Carpenter, 1866c, p. 335]

The original data on this species are in an unsatisfactory state. The holotype is not available, and no definite type locality can be known. Carpenter intimated in the above discussion that the shell was from the West Coast. Carpenter first listed the species from "Columbia

<sup>50</sup> Considered by Inst. Com. Zool. Nomen. See Bull. Zool. Nomen., 1950, vol. 4, pts. 13-15, p. 389-392. *Acmaea* Eschscholtz not a homonym of *Acme* Hartmann, 1821, or *Acmea* Hartmann, 1821. *Acmaea* Eschscholtz, 1833, placed on Official List of Generic Names with type species as stated above. *Acme* Hartmann, 1821, and *Acmea* Hartmann, 1821, placed on Official List of Rejected and Invalid Generic Names. See Opinion 344, 1955, Int. Rules Zoological Nomenclature.

<sup>51</sup> Menke (1846, p. 70-74) full title, discussion; p. 74 on *Acmaea* Eschscholtz. Further discussion with species enumerated, Philippi (1846, p. 106-108)



River, San Francisco, De Fuca" (1857b, p. 211) and "Oregon and Upper California" (1857b, p. 319). There seems to be no doubt that the West Coast is its proper habitat.

The few remarks by Carpenter accompanying the name (1866c, p. 335) make a dubious valid description. Pilsbry regarded the name as a *nomen nudum*, which seems a legitimate deduction. Carpenter, therefore, is not the valid author of the name. No subsequent author has described the subspecies or species. The description published by Oldroyd as of "*cribaria*" was that for *A. patina* mut. *fenestrata* "Nutt."

If Test regarded the subspecies as biologically sound it would be appropriate for Test (ms. thesis, ms. Univ. California) to publish her description of the form designating a holotype and type locality. It would then date from such a description and author. Test (1946) referred the subspecies to Gould as author.

*Type*.—Not found

*Distribution*.—"Purchased at the Sandwich Isls." (Gould in Carpenter, 1866c) West Coast, United States (type); Alaska, Aleutian Islands, south to Cayucos, California (Burch)

#### *Acmaea funiculata* (Carpenter)

(Pl. 17, figs. 24, 25)

*Scurria* (? var.) *funiculata* CARPENTER, 1864b, p. 612, 650; Reprint, 1872, p. 98, 136; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 214; 1866, Oct., Amer. Jour. Conch., vol. II, p. 347; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 24; 1870, Amer. Jour. Conch., vol. VI, p. 60; DALL, 1871, Amer. Jour. Conch., vol. VI, p. 242

*Scurria mitra tenuisculpta* CARPENTER, 1866, Amer. Jour. Conch., vol. II, p. 346. See additional synonymy and notes under separate heading

*Acmaea mitra* var. *funiculata* (Carpenter), PILSBRY, 1891, Man. Conch., vol. XIII, p. 25; DALL, 1921, p. 168; OLDROYD, 1927, vol. II, pt. III, p. 145

*Acmaea funiculata* (Carpenter), HANNA AND SMITH, 1931, Nautilus, vol. 45, no. 1, p. 21–25, pl. 2, figs. 1, 3, 4; KEEN, 1937, p. 28; WOODRING, BRAMLETTE, and KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 61, pl. 34, figs. 1, 2 Pleistocene; BURCH, 1946, no. 56, p. 35; no. 57, p. 5, 6; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 199

"With rounded riblets, somewhat nodulous." [Carpenter, 1864b, p. 650]

Hanna and Smith have presented a thorough discussion with pertinent data on and illustration of the species and with copies of the various early descriptions of the species. Those descriptions are not repeated here.

The holotype is figured for the first time herein. The apex of the holotype is worn, but the radiating ribs, of which there are about 36, are strong. There are no secondary ribs, but the primaries, as well as the interspaces, are irregular in size.

Dall placed the variety named by Carpenter *tenuisculpta* (1866) as the same as *funiculata*. Marshall (in Hanna and Smith, 1931, p. 23), after comparing the types of both, agreed with Dall's consolidation. Test (1946) did not indicate *A. funiculata* as a distinct species. Burch (1946, no. 57, p. 6, 7) gave it as a separate form.

The type of this species was catalogued in the Smithsonian Institution (U. S. National Museum) by Carpenter as "*Scurria funiculata* type." The specimen has a label, "Monterey Cooper". A note on the label, probably made by Dall, reads, "extreme var. of mitra?"

*Holotype*.—U. S. National Museum, no. 14799 (*A. funiculata*). no. 15490 (var. *A. tenuisculpta* "Carpenter")

*Distribution*.—Recent. Monterey, California (type, *A. funiculata*). Shumagin Islands, Alaska, to Magdalena Bay, Lower California (Dall); (not of Test, 1946). Pleistocene. California (Woodring, Bramlette, and Kew)

#### *Acmaea limatula* Carpenter

*Acmaea* [*scabra*] var. *limatula* CARPENTER, 1864b, 540 San Diego, 650, 665 "temperate." Lower California var. of *A. scabra*; Reprint, 1872, p. 26, 136, 151; 1866, Amer. Jour. Conch., vol. II, p. 335, 340; PILSBRY, 1891, Man. Conch., vol. 13, p. 14, pl. 3, figs. 38, 39, 40 "original;" 45, 46, "original," San Diego

*Acmaea limatula* Carpenter, DALL, 1921, p. 170 section *Collisella*; OLDROYD, 1927, vol. II, pt. III, p. 152 section *Collisella*; GRANT AND GALE, 1931, p. 810; BAILY, 1935, West Coast

Shells (KEEP), p. 173; VOKES, 1936, *Nautilus*, vol. 50, no. 2, p. 49; JOHNSON AND SNOOK, 1935, *Seashore Animals*, p. 542, fig. 613; KEEN, 1937, p. 28; BURCH, 1946, no. 57, p. 14 subgenus *Collisella*; TEST, 1946, *Cont. Univ. Michigan Lab. Vert. Biol.* no. 31, p. 1, 13, 15; WOODRING, BRAMLETTE, AND KEW, 1946, *U. S. Geol. Sur., Prof. Paper*, 207, p. 61 Pleistocene; SMITH AND GORDON, 1948, *California Acad. Sci., Proc.*, ser. 4, vol. XXVI, p. 199; ABBOTT, 1954, p. 102, pl. 18, fig. 0

"Var. *limatula* of [*A. scabra*], sculpture stronger, border black: perhaps = Maz. Cat. no. 265." [Carpenter, 1864b, p. 650]

"A well-marked variety seems to have an admixture of black blood, probably from intermarriage with the negro race of *A. patina*. With the same sculpture externally, the interior has the broad black margin of *A. patina*, (var. *scutum*), and a dark spot in the centre. One specimen is dark all over. Another stout dwarfed shell has a prettily tessellated border, and would (in a mixed collection) be taken for *A. cymbiola*, Gld., = *P. parasitica*, D'Orb.—As I have seen no intermediate specimens between the two forms, this may be described as var. *limatula*, "*A. scabra*, Nutt." extus sculpturâ normali; seu intensiore lirulis quibusdam majoribus, valde nodosis; intus albidâ, nitidâ; limbo lato nigro, seu rarius tessellato; spectro saepius fusco maculato.

"It is probably the *Acmaea patina* of the Mazatlan Catalogue, sp. 265, but the specimens were too much worn outside to decide with confidence." [Carpenter, 1866c, p. 340]

Pilsbry (1891) figured "original" specimens of this species from Smithsonian Institution collections as stipulated in the explanation of his illustrations (pl. 3). The specimens of Figures 45 and 46 he stated in the text (p. 14) to be from San Diego. The first and only definite reference by Carpenter to the form was to a San Diego shell (Carpenter, 1864, p. 540). Although the types are not extant, the type locality is San Diego. A lectotype might well be selected from the specimens figured by Pilsbry.

*Type*.—Not found

*Distribution*.—Recent. San Diego, California (type). Puget Sound, to Maria Madre Island, Mexico, Gulf of California north to Coronados Islands (Test in Burch); Crescent City, California, to La Paz, Gulf of California (Test 1946). Pleistocene. California (Oldroyd, 1925; Stephens, 1929; Grant and Gale; Woodring, Bramlette, and Kew)

#### "*Acmaea mitra tenuisculpta* Dall"

(Pl. 18, figs. 11-13)

See also [under] *A. funiculata* (Carpenter).

*Scurria mitra tenuisculpta* CARPENTER, 1866, *Amer. Jour. Conch.*, vol. II, p. 346; HANNA AND SMITH, 1931, *Nautilus*, vol. 45, no. 1, p. 23

*Acmaea mitra tenuisculpta* (Carpenter), DALL, 1871, *Amer. Jour. Conch.*, vol. VI, p. 242; PILSBRY, 1891, *Man. Conch.*, vol. III, p. 25

"*Acmaea tenuisculpta* Cpr.," DALL, 1914, *Nautilus*, vol. 28, no. 2, p. 14 "A . . . *funiculata* Cpr. merges into"

"*Acmaea tenuisculpta* (Carpenter)", HANNA AND SMITH, 1931, *Nautilus*, vol. 45, no. 1, p. 23 notes by Marshall on type

This nude name of Carpenter is represented by 4 syntypes in the U. S. National Museum, no. 15490, labelled "Neeah Bay Swan." If Dall's (1871) brief comparison, using Carpenter's name, with *A. mitra* be regarded as adequate to validate the name of a form of subspecific worth, Dall must be credited as the author and not Carpenter. Dall's comments (1871, p. 242) were as follows:

"The striated variety (*tenuisculpta*, Cpr.) [of *A. mitra*] appears very distinct from the smooth form, but every gradation may be found in a very large series. The unique type of *Scurria* ? *funiculata*, Cpr., now before me, differs from the smallest specimen of *tenuisculpta*, only in having the riblets even more prominent, close, and rounded, and being thinner and smaller. . . ."

The types were regarded by Dall and Marshall as equivalent to *A. funiculata*. The notes concerning the name and specimens are included here in detail for completeness and readiness of reference and not as representing a subspecies.

*Syntypes*.—U. S. National Museum, no. 15490

*Distribution*.—Neeah Bay, Washington (type). Same as *A. funiculata*

**Acmaea rosacea** Carpenter

*Acmaea* (? *pilcolus*, var.) *rosacea* CARPENTER, 1864b, p. 614, 650, Reprint, 1872, p. 100, 136; 1866a, Feb., California Acad. Sci., Proc., vol. III, p. 213; 1866c, Oct., Amer. Jour. Conch., vol. II, p. 341; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 23

*Acmaea rosacea* Carpenter, COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 60; KEEP, 1887, West Coast Shells, p. 100; PILSBRY, 1891, Man. Conch., vol. XIII, p. 21, pl. 7, figs. 71, 72, 73 type; DALL, 1921, p. 170; KELSEY, 1922, Nautilus, vol. 36, no. 1, p. 18; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 168; 1927, vol. II, pt. III, p. 156; BAILY, West Coast Shells (KEEP), p. 175; KEEN, 1937, p. 28; BURCH, 1946, no. 56, p. 35; no. 57, p. 5, 14 subgenus?; TEST, 1946, Cont. Univ. Mich. Lab. Vert. Biol., no. 31, p. 1; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 200

*Collisella* (?) *rosacea* DALL, 1871, Amer. Jour. Conch., vol. VI, p. 256

—Monterey to San Diego. This shell is named *pilcolus* Midd., in Mus. Cuming, but does not agree with the diagnoses. It can hardly be distinguished from Herm specimens of *A. virginica*. It was first brought by Col. Jewett, but referred to Panama." [Carpenter, 1864b, p. 614]

"Pink, small: like Herm specimens of *virginica*." [Carpenter, 1864b, p. 650]

The following lines should be added to Carpenter's description (1866) as published by Oldroyd (1927), to make that copy complete:

Delete "poll."<sup>52</sup> and add:

"—div. 100°.

"*Hab.* San Diego, 1 sp. jun. (*Palmer*): Monterey, 1 dead sp. *Cooper*."

"The absence of striae, very thin texture, and regularly conical growth, distinguish this shell from *A. patina*, a rare variety of which has a pinkish tinge. Specimens in Mus. Cuming are marked '*pilcolus*, Midd.' but do not accord with the diagnosis. It is almost exactly like Herm\* specimens of *A. virginica*. Col. Jewett's similar shells, marked "Panama" were perhaps West Indian." [Carpenter, 1866a, p. 213]

\* "A small island in the British channel."

Carpenter repeated (1866c, Oct.) his description (1866a, Feb.) and presented in detail the description of *A. pilcolus* Middendorf.

Pilsbry described the species and figured the holotype. Dall gave a detailed description based on the holotype. The holotype has a label "San Pedro, Dr. Palmer."

*Dimensions*.—Holotype, 5 mm. length; 4 mm. width; 2 mm. height.

*Holotype*.—U. S. National Museum, no. 15273

*Distribution*.—Recent. San Pedro, California (type); Ketchikan, Alaska, south to Panama (Burch). Pleistocene. Mexico. (Hertlein, 1934)

**Acmaea strigatella** Carpenter

*Acmaea strigatella* CARPENTER, 1864, June, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 474; Reprint, 1872, p. 214; 1864b, Aug., Suppl. Rept. British Assoc. 1863, p. 666; Reprint, 1872, p. 152; 1865, Zool. Soc. London, Proc., p. 277, Reprint, 1872, p. 268; PILSBRY, 1891, Man. Conch., vol. XIII, p. 27, pl. 7, figs. 83, 84, 85 type; PILSBRY AND LOWE, 1932, Acad. Nat. Sci., Philadelphia, Proc., vol. LXXXIV, p. 129

*Acmaea strigillata* CARPENTER, 1864b, p. 618; Reprint, 1872, p. 104 typographical error for *A. strigatella*

*Collisella strigatella* (Carpenter), DALL, 1871, Amer. Jour. Conch., vol. VI, p. 253, ? pl. 14, fig. 5

*Acmaea persona strigillata* Carpenter, DALL, 1921, p. 170 in part; OLDROYD, 1927, vol. II, pt. III, p. 155

Not *Acmaea patina strigillata* (= *A. strigillata* Nutt.) CARPENTER, 1866, Amer. Jour. Conch., vol. II, p. 334, 337

*Acmaea* (*Patelloidea*) *persona strigatella* Carpenter, BURCH, 1946, no. 57, p. 10

*Acmaea persona* ? *strigatella* Carpenter, SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 200

The following corrections and lines should be added to the copy of the original description as published by Oldroyd to make the copy complete:

Read .9 for 9; .74 for 74; .3 for "3."

"Variat colore hic et illic aurantiaco tincto: strigis omnino tessellatis.

<sup>52</sup> Carpenter (1866, Oct., p. 341) gave the same measurements in "poll;" in this case the "poll" would be admissible.

"According to Darwin, this might be regarded as a cross between the northern forms *A. pelta* and *A. patina*, about to change into the Gulf species, *A. mesoleuca*. The dark variety resembles *A. cantharus*, but the very delicate crowded striae will distinguish it when not abraded." [Carpenter, 1864a, p. 474]

Pilsbry presented a detailed description and illustration of the type which is in the U. S. National Museum. Burch (1946) has analyzed clearly and correctly the confusion in the names of *strigatella* and *strigillata*. The use of *strigillata* by Carpenter (1864b) is easily dispensed with because it is a typographical error. Carpenter gave a description (1866c) using a manuscript name of Nuttall. He defined it as a variety of *A. patina* and differentiated it from *A. strigatella* of the Lower Californian fauna.

The form *A. patina strigillata* "Nuttall," Carpenter is ambiguous as to type and type locality. Carpenter (1866c) intimated that it was from California or Vancouver. It is in part the *A. persona strigillata* of Dall (1921), but until the type locality and type are defined a precise distribution is not authentic. The type has not been found.

The first use of *A. strigillata* was a typographical error, hence a *nomen nudum*, and therefore does not preoccupy the name as stated by Burch (homonym).

Burch's suggestion that *A. persona* (= *A. persona strigillata* "Nuttall" Carpenter) is the northern form and *A. persona strigatella* the southern seems feasible.

*Holotype*.—U. S. National Museum, no. 19594 (*A. strigatella*)

*Distribution*.—Cape San Lucas, Lower California (type); Monterey, California, to Lower California (Burch). Not included as California species by Test (1946).

#### "*Acmaea strigillata* Nuttall" Carpenter

"*Patella strigillata* Nutt. ms. Jay's Cat. no. 2881." CARPENTER, 1856, Zool. Soc. London, Proc., p. 221 under *A. pelta pars*; CARPENTER, 1866, Amer. Jour. Conch., vol. II, p. 334, 337 *P. strigillata* Nutt., *pars* under *A. patina* not p. 337 under *A. pelta*. Not *Acmaea strigillata* CARPENTER, 1864b, p. 618; Reprint, 1872, p. 104 error for *A. strigatella*

*Acmaea patina* var. *strigillata* Carpenter, BURCH, 1946, no. 57, p. 10

"Var. *b. strigillata* [of *A. patina*]: (= *A. strigillata*, Nutt., *pars* = *A. pelta* jun.) Part of the shells thus grouped by Gould, 'marginal rim narrower', may also be *A. pelta*, jun. The colors run into stripes, radiating bifurcating. Under ordinary circumstances, this variety is not so elevated as *A. pelta*; has not its faint, swelling ribs; but displays, instead, the typical, sharp, distant striae; and has a wider margin; but young shells with the outside abraded, are very difficult to determine or to separate from *A. strigatella* of Cape St. Lucas; q. v. in Ann. Nat. Hist." [Carpenter, 1866c, p. 334]

For an analysis of the history of this name see also *Acmaea strigatella* Carpenter. Jay (1852, p. 102, no. 2881) indicated the locality as "Upper California," for Nuttall's shell.

The type of this species has not been found. It is not at the British Museum Natural History (G. L. Wilkins, Oct. 17, 1950, personal communication) where some of Nuttall's material is preserved.

#### Subgenus *Collisella* Dall, 1871

*Collisella* DALL, 1871, Amer. Jour. Conch., vol. VI, p. 245

Type species by original designation *Collisella pelta* (ESCHSCHOLTZ) in RATHKE, 1833, Zool. Atlas, pt. 5, p. 19. Recent. Okhotsk and southern Bering Sea, Nushagak, Alaska, Aleutians south to Rosaria Bay, Lower California and Socorro Islands (Dall). Japan, (KEEN, 1941, Sixth Pacific Cong., vol. 3, p. 481; BURCH, 1946). DALL, 1871, pl. 14, fig. 6 radula; PILSBRY, 1891, Man. Conch., vol. XIII, pl. 8, figs. 90, 91 "original"; ABBOTT, 1954, pl. 18, fig. n

#### *Acmaea* (*Collisella*) *triangularis* (Carpenter)

(Pl. 18, fig 18)

*Nacella* (? *paleacea*, var.) *triangularis* CARPENTER, 1864b, p. 612, 650; Reprint, 1872, p. 98, 136; 1866, California Acad. Sci., Proc., vol. III, p. 213; KEEP, 1887, West Coast Shells, p. 104

*Nacella triangularis* Carpenter, COOPER, 1867, Geo. Cat. Moll., Geol. Sur. California, p. 23; 1870, Amer. Jour. Conch., vol. VI, p. 59

*Acmaea* (*Collisella*) ? *triangularis* (Carpenter), DALL, 1871, Amer. Jour. Conch., vol. VI, p. 254

*Acmaea triangularis* (Carpenter), PILSBRY, 1891, Man. Conch., vol. XIII, p. 20, pl. 7, figs. 77, 78 type; OLDROYD, 1927, p. 158; BAILY, 1935, West Coast Shells (KEEP), p. 175 ? var. *A. paleacea*; KEEN, 1937, p. 28; Burch, 1946, no. 57, p. 13; TEST, 1946, Cont. Univ. Mich. Lab. Vert. Biol., no. 31, p. 1, 18; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 200

*Acmaea triangularis casta* Carpenter ms. DALL, 1871, Amer. Jour. Conch., vol. VI, p. 254; PILSBRY, 1891, Man. Conch., vol. XIII, p. 20, pl. 7, figs. 74-76 type

*Acmaea (Collisella) triangularis* (Carpenter), BURCH, 1946, no. 56, p. 35, no. 57, p. 5 per Test, p. 13

"*Nacella* ? *triangularis*. Shorter [than *N. paleacea* Gould] apex raised; scarcely striated; whitish, with brown spots." [Carpenter, 1866a, p. 650]

The following lines should be added to the copy of Carpenter's description (1866a) as published by Oldroyd (1927) to make that copy complete:

"—alt. 0.18, div. 90°.

"*Hab.* Monterey, 4 dredged dead. Cooper.

Probably a distinct species. The solitary shell sent by Dr. Cooper is shaped like a right-angled triangle, with five large brown spots near the base." [Carpenter, 1866a, p. 213]

Dall (1871) discussed this species in detail and introduced a manuscript varietal name *casta* of Carpenter. Pilsbry (1891) illustrated the holotype of each name. The specimen illustrated is not available. Therefore, the specimen labeled "type" in the Redpath Museum is logically eligible as lectotype. Neither author regarded the varietal name as necessary.

There are in the Redpath Museum 14 specimens with an original label, "*Nacella casta* Cpr. (var. = *triangularis*) type Monterey." There is a note with the specimen, "I think this series of specimens prove that they *all belong to one species*. I have two specimens (not worn) that are perfectly white. It is obvious then the name '*depicta*' [Hinds] is not appropriate; nor is the name '*triangularis*' unless it refers to the profile of the shell. C. A. Canfield Monterey Nov. 5, 1867."

One of the above shells is figured herein. Some of the shells are white, others are marked like the illustrated shell. All the specimens have a conspicuous brown spot just below the apex. Some have brown radiating spots over the surface. One individual has 5 spots on the posterior end. The external margins are all white with the marks above. A few specimens have a pinkish interior.

The type of *A. triangularis* was figured by Pilsbry (1891).

*Syntypes*.—U. S. National Museum, no. 14802 (*A. triangularis*); Redpath Museum, no. 2370 (*casta* Carpenter ms.).

*Distribution*.—Monterey, California (type); Sitka, Alaska, to the Gulf of California, on sea grasses (Dall); Monterey, California, on calcareous alga *Amphiroa tuberculosa* Decaisne (Chace in Burch; Smith and Gordon).

#### "*Acmaea monticola* (*monticola*)"

"*Patella monticola* Nutt. MS. = *P. monticolor* Jay's Cat. no. 2844" CARPENTER, 1856, Zool. Soc. London, Proc., p. 221 under *Acmaea felta* Esch.

*Acmaea monticola* NUTTALL MS. in CARPENTER, 1864b, p. 586 ["*monticola*"]; Reprint, 1872 not described; CARPENTER, 1866, Amer. Jour. Conch., vol. II, p. 337 not described "*monticola*"; PILSBRY, 1891, Man. Conch., vol. XIII listed under *A. felta* ?, p. 17 "*monticola*," p. 34, "*monticola*" under *A. ceciliata*

*Acmaea cassis monticola* (Carpenter), DALL, 1921, p. 169 as of CARPENTER, 1866, Amer. Jour. Conch., vol. II, p. 337

*Acmaea (Collisella) felta* (Eschscholtz), BURCH, 1946, no. 56, p. 34; no. 57, p. 10 *monticola* regarded as variant

*Acmaea monticola* Dall, SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 200 synonym of *A. felta*

*A. "monticola"* ("*monticola*") is certainly a *nomen nudum* (or *nomina nuda*), because no description was given by Carpenter or Dall. The name has been credited to both authors. The only remark Carpenter made concerning the form (1866c) is, "In its [*felta*] early adolescence, irregular decorticated shells are the *A. monticola* of Nutt. MS." That is not an adequate description. Dall (1921, p. 169) referred to the above reference of Carpenter, and

hence his name is no more valid than the initial remarks. There is also a confusion in the spelling which makes further confusion in the use of the name.

No types exist for the name. If it is to acquire proper status it must be described by some author subsequent to those already credited. It is assumed by workers to be synonymous with *A. pelta*.

"*Patella* (? *toreuma*) *tenuilirata*" Carpenter

*Patella* (? *toreuma*) *tenuilirata* CARPENTER, 1855, p. 233; 1857b, p. 288; PILSBRY, 1891, p. 233 was described as from "Monterey."

Tomlin, (1925, p. 121) identified the syntypes of the species, which are in the British Museum, as "*Cellana radians* Gmelin, the common New Zealand limpet" (Powell, 1937, pl. 1, fig. 10; 1946, Pl. 1, fig. 10). The name can, therefore, be authentically eliminated from the list of California species.

Family LEPETIDAE

Genus *Lepeta* Gray, 1847

*Lepeta* GRAY, 1847, Zool. Soc. London, Proc., pt. XV, p. 168. For *Lepeta* GRAY, 1840; 1842, See IREDALE, 1913, Malacol. Soc., London, Proc., vol. 10, p. 294-309; p. 306

Type species by monotypy and original designation *Patella caeca* MÜLLER, 1776, Zool. Danicae Prod. An., p. 237. Recent. Northern Europe. Greenland to Massachusetts, 2-300 fathoms (Johnson, 1934). PILSBRY, 1891, Man. Conch., vol. XIII, pl. 40, figs. 29-32; ABBOTT, 1954, pl. 17, fig. j

Subgenus *Cryptobranchia* Middendorff, 1851

(*Cryptoctenidia* Dall, 1918)

*Cryptobranchia* MIDDENDORFF, 1851, Reise Auss. Norden und Ost. Sibiriens, vol. 2, p. 183  
Type species by subsequent designation, DALL, 1870, Amer. Jour. Conch., vol. V, pt. III, p. 143. *C. concentrica* (Middendorff), 1851, Reise Auss. Norden und Ost. Sibiriens, vol. 2, p. 183, *fidc* Dall. Recent. Icy Cape, Arctic Ocean, on the west to Okhotsk Sea and Shantar Islands, Alaska, to Puget Sound. MIDDENDORFF, 1851, pl. XVI, fig. 6, *fidc* Dall. DALL, 1870, Amer. Jour. Conch., vol. V, pt. III, p. 143, pl. 15, fig. 2, a to g; PILSBRY, 1891, Man. Conch., vol. XIII, p. 40, figs. 33-37

*Lepeta* (*Cryptobranchia*) *caecoides* (Carpenter)

(Pl. 18, figs. 14, 15)

*Lepeta caecoides* CARPENTER, 1864b, p. 603, 651, 683; Reprint, 1872, p. 89, 137, 169; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 60; 1866, Amer. Jour. Conch., vol. II, p. 347; COOPER, 1867, Geog. Cat. Moll. Geol. Sur. California, p. 24; KEEN, 1937, p. 37; WILLETT, 1942, in BURCH, no. 18, p. 3

*Lepeta* (*Cryptobranchia*) *concentrica* (Middendorff), DALL, 1870, Amer. Jour. Conch., vol. V, pt. 3, p. 143 in part; 1878, U. S. Nat. Mus., Proc., vol. 1, p. 334 in part

*Lepeta concentrica* (Middendorff), PILSBRY, 1891, Man. Conch., vol. XIII, p. 69 in part, section *Cryptobranchia*

*Lepeta* (*Cryptoctenidia*) *caecoides* Carpenter, DALL, 1921, p. 168; OLDROYD, 1927, vol. II pt. III, p. 143

*Lepeta* (*Cryptobranchia*) *caecoides* (Carpenter), BURCH, 1946, no. 57, p. 5

"Like caeca, but apex turned back. Farallone Is. teste R. D. Darbshire." [Carpenter, 1864b, p. 651]

The following lines should be added to the copy of Carpenter's description (1865) in Oldroyd (1927) to make the copy complete:

"... div. 90°.

"*Hab.* Specimina juniora perpaucaviventia in sinu Pugetiano piscavit *Kennerley*: ex insulis Farallonibus adulta affertur, teste Darbshire." [Carpenter, 1856e, p. 60]

"The first perfect specimen of this shell was dredged by Dr. Kennerley; a larger, broken shell, received before by Mr. R. D. Darbshire from the Farallones Islands, having been passed over as *Scurria mitra*. A number of small, but beautifully perfect specimens have lately been sent to the Smithsonian Institute from Sitcha. They are thin; white, tinged with greenish at the margin, and often with pink within; and very delicately sculptured. It is known at once from all the *Aemaecae* by its semitransparent texture and white color; and from the young of *Scurria mitra* by its broad, flat shape, obtuse apex, and excurved posterior

profile. The striulae are more or less expressed, more or less distant, and rarely slightly granular; they are always most developed on the back, and subobsolete in front. The genus (as described by Forbes) is curiously like an *Emarginula* without a slit. The Sitcha specimens range to long. .57, lat. .48, alt. .2. In color, sculpture, etc., it exactly resembles *L. caeca*; but that species, as dredged off Norway, by M'Andrew and as represented in the Cumingian collection, is conical, while *cacoides* is Ancyloid. Messrs. Adams figure *Propilidium ancyloide*, Forbes and Hanl., under the name of *Lepeta caeca*; but the examples above quoted are widely different. My most reliable friend Mr. Arthur Adams, collected specimens both of *caeca* and *cacoides* in the Japanese waters. The shells collected by Dr. Stimpson in the North Pacific Exploring Expedition (Hakodadi and Arctic Ocean) were marked *Lepeta 'caeca*, var. *concentrica* Midd.' by Dr. Gould: Smiths. Cab. no. 1718" [Carpenter, 1866c, p. 347]

The holotype has a printed label, "Type Puget Sound Kennerley."

*Holotype*.—U. S. National Museum, no. 11849

*Distribution*.—Puget Sound (type); Arctic and Bering Seas to Hakodate, Japan,<sup>53</sup> the Aleutian Islands, and south to the Farallon Islands, California (Dall); 10-30 fathoms (Willett).

#### Family TROCHIDAE

#### Genus *Margarites* Leach in Gray, 1847

*Margarites* LEACH in GRAY, 1847, Ann. Mag. Nat. Hist., vol. 20, p. 271; DALL, 1909, U. S. Geol. Sur., Prof. Paper 59, p. 97

*Margarita* LEACH in ROSS, 1819, Voyage of Discovery, H.M.S. Isabella and Alexander, Baffin's Bay, app. II, p. LXI, not *Margarita* LEACH, 1814, Zool. Misc., vol. 1, p. 107 *vide* Neave

*Eumargarita* FISCHER, 1885, Man. de Conchyliol., p. 825, pl. X, fig. 7 *M. helicina* (Fabricius)

Type species by monotypy, *Margarites diaphana* = *Helix margarita* Montagu = *Turbo helicinus* FABRICIUS, 1780, Fauna Groenlandica, p. 393 = *T. helicinus* PHIPPS, 1774, Voy.

North Pole in 1773, app., p. 198. Recent. Circumboreal, to England, in Europe, Massachusetts Bay on west Atlantic, and to Catalina Island on the Pacific Coast. PILSBRY, 1889, Man. Conch., vol. XI, p. 286 synonymy, pl. 64, figs. 45-47

#### *Margarites lacunatus* (Carpenter)

(Plate 17, figs. 22, 23)

*Gibbula lacunata* CARPENTER, 1864b, Aug., p. 627, 653; Reprint, 1872, p. 113, 139; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 425; Reprint, 1872, p. 239; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128 under *M. lirulata*; PILSBRY, 1889, Man. Conch., vol. XI, p. 297 under *M. lirulata*

*Margarites (Lirularia) lacunata* (Carpenter), DALL, 1921, p. 179; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 176; 1927, vol. 11, pt. 111, p. 206

*Margarites lacunatus* (Carpenter), KEEN, 1937, p. 39; BURCH, 1946, no. 58, p. 9.

"Very small, nearly smooth, umbilicus hemmed-in by swelling of columella.." [Carpenter, 1864, p. 653]

The following line should be added to the copy of Carpenter's description (1864, Dec.) as republished by Oldroyd to make that copy complete:

"*Hab.* Neeah Bay (*Swan*)." [Carpenter, 1864b, p. 425]

The label of the holotype reads, "Type Neeah Bay, W.T.J.G. Swan."

*Holotype*.—U. S. National Museum, no. 15535b

*Distribution*.—Neeah Bay, Washington (type), Neeah Bay, Washington, to San Diego, California (Dall)

#### *Margarites tenuisculptus* Carpenter

*Margarita* (? v. [*Vahl*ii]) *tenuisculpta* CARPENTER, 1864b, p. 603, 653; Reprint, 1872, p. 89, 139; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 61; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128

under *M. lirulata* Carpenter in part; PILSBRY, 1889, Man. Conch., vol. XI, p. 297 under *M. lirulata*

<sup>53</sup> Keen (1941, p. 481) did not include this species in the list of species common to Japan and western North America. Tadashige Habe (June 22, 1955, personal communication) stated that this species has not been found since the original discovery.

*Margarites (Margarites) (vahlii var.?) tenuisculpta* (Carpenter), DALL, 1921, p. 181; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 178; 1927, vol. II, pt. III, 214  
*Margarites tenuisculptus* (Carpenter), KEEN, 1937, p. 39  
*Margarites (Margarites) tenuisculptus* (Carpenter), BURCH, 1946, no. 58, p. 11

"... Like *obsoleta*, but operc. ribbed." [Carpenter, 1864b, p. 653]

"M. t. '*M. Vahlia*' forma, colore, et opercula similima; sed striulis spiralibus, plus minusve obsoletis cincta, quarum IV-VI in spira monstrantur. Long. .22, long. spir. .11, lat. 13, div. 70°

"*Hab.*—Puget Sd., Kennerley. Neeah Bay, Swan.

"Except in the very faint spiral sculpture, which does not always appear a constant character in *Margaritae* (v. *M. undulata* in Fbs. and Hanl. Br. Moll.,) these shells might stand for *M. Vahlia*, a ? variety of which was found sparingly by Dr. Kennerley. They are sometimes painted with infrasutural flammules of darker ash. Both the smooth and the striated forms have a prominent spiral rib on the whorls of the operculum." [Carpenter, 1865e, p. 61]

The holotype of this species has not been found. There is a specimen at the Academy of Natural Sciences of Philadelphia, no. 38192, bearing an original label, "*Margarites* ? var. *tenuisculpta* Smithsonian Neeah Bay." The specimen is pasted on a small piece of cardboard, which in turn is pasted on an A.N.S.P. label. This specimen in lieu of a more authentic original Carpenter specimen might be selected as a neotype.

In early work Dall and Pilsbry considered this species synonymous with *M. lirulata* Carpenter, but in 1921 Dall listed it as separate from that form.

*Holotype*.—Not found

*Distribution*.—Puget Sound or Neah Bay, Washington (type); Puget Sound, Washington, and Vancouver Island, British Columbia, to South Coronado Island, California (Burch)

#### Subgenus *Pupillaria* Dall, 1909

*Pupillaria* DALL, 1909, U. S. Geol. Sur., Prof. Paper 59, p. 97.

Type species by original designation *Margarites pupillus* (GOULD), 1849, Boston Soc. Nat. Hist., Proc., vol. 3, p. 91; 1852, U. S. Expl. Exped., Moll., vol. 12, p. 186, Atlas, 1856, pl. 12, fig. 208. Living. Nunivak Island, Bering Sea, to San Pedro, California (Dall). ABBOTT, 1954, fig. 31c

#### *Margarites (Pupillaria) acuticostatus* Carpenter

*Margarites acuticostata* CARPENTER, 1864b, Suppl. Rept. British Assoc. 1863, p. 612, 653; Reprint, 1872, p. 98, 139; 1864, July-Dec., California Acad. Sci., Proc., vol. III, p. 157; COOPER 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; PILSBRY, 1889, Man. Conch., vol. XI, p. 297 under *M. lirulata*.

*Margarites (Lirularia) acuticostata* (Carpenter), DALL, 1921, p. 180, pl. 18, fig. 5 type; OLDROYD, 1927; vol. II, pt. III, p. 208

*Margarites acuticostatus* (Carpenter), KEEN, 1937, p. 39; Burch, 1946, no. 58, p. 10; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 202

"Small, painting clouded: 3 sharp ribs on spine. 8-20 fm. Cp." [Carpenter, 1864b, p. 653]

The following should be added to the copy of Carpenter's description (1864 July-Dec.) as republished by Oldroyd (1927) to make that copy complete:

"*Hab.* Santa Barbara, in kelp-root, 2, dead; Catalina Island, 8-10 fms. 20, some alive; Monterey, 20 fms. 4, dead.

"This shell might be taken for a delicate form of *Gibbula parcipicta*, which in painting it exactly resembles. It is known from Vancouver *M. lirulata* by the three sharp keels on the spire, between which there are no others intercalating, and by the details of sculpture. The patches of color are very variable, sometimes scarcely appearing; and are generally deeper tinted on the keels, giving a false appearance of granulation." [Carpenter, 1864e, p. 158]

The syntypes consist of two specimens labelled, "Catalina Id. Cooper type." Dall figured (1921) one of the specimens as type. The type locality thus becomes Catalina Island instead of Santa Barbara.

*Lectotype*.—U. S. National Museum, no. 16280

*Distribution*.—Catalina Island, California (type); Bodega Bay, to Guadalupe Island, Mexico (Burch)



**Margarites (Pupillaria) funiculatus** (Carpenter)

*Gibbula funiculata* CARPENTER, 1864b, Aug., p. 628, 653; Reprint, 1872, p. 114, 139; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 427; Reprint, 1872, p. 239; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128, under *M. lirulata*; PILSBRY, 1889, Man. Conch., vol. XI, p. 297 under *M. lirulata*

*Margarites (Lirularia) funiculata* (Carpenter), DALL, 1921, p. 179, pl. 18, fig. 10 type; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 176.

*Margarites funiculata* (Carpenter), OLDROYD, 1927, vol. II, pt. III, p. 199

*Margarites funiculatus* Carpenter, KEEN, 1937, p. 39; BURCH, 1946, no. 58, p. 8

"Shaped like *Montagui*: with rounded spiral riblets." [Carpenter, 1864b, p. 653]

The following line should be added to the copy of Carpenter's description (1864) as published by Oldroyd (1927) to make that copy complete:

"*Hab.* Neeah Bay (*Swan*), specimen unicum." [Carpenter, 1864d, p. 425]

The holotype was figured by Dall (1921). The specimen measures 6 mm. height and 5 mm. greatest diameter, which is higher than the measurement given by Dall (1921). The label reads, "unique type Neeah Bay, W.I.J.G. Swan."

*Holotype*.—U. S. National Museum, no. 15534b

*Distribution*.—Neah Bay, Washington (type)

**Margarites (Pupillaria) inflatulus** Dall

(Pl. 18, fig. 9, 10)

*Margarita inflata* CARPENTER, 1864b, p. 603, 653, no. 300; Reprint, 1872, 89, 139 in part; in part COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26

In part *M. rhodia* DALL, 1921

Not *Turbo inflatus* TOTTEN, 1834, Amer. Jour. Sci., vol. 26, p. 368; not *Trochus inflatus* SMITH, 1839, Mem. Wernerian Soc., vol. 8, pl. 1, fig. 10; MORRIS, 1843, Cat. Brit. Fos., p. 150 *Margarita fide* SHERBORN, 1927, Index Animalium.

*Margarita pupilla* Gould, DALL, 1871, Amer. Jour. Conch., vol. VII, p. 127, in part; PILSBRY, 1889, Man. Conch., vol. XI, p. 295 in part

*Margarites (Lirularia) inflatula* DALL, 1919 [not 1920 as printed in DALL, 1921], U. S. Nat. Mus., Proc., vol. 56, no. 2295, p. 365 new name for *M. inflata* CARPENTER, 1864b and 1865e in part; DALL, 1921, p. 179; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 177; 1927, vol. II, pt. III, p. 207; KEEN, 1937, p. 39 *inflatulus*; BURCH, 1946, no. 58, p. 9 *inflatulus*

"Thin, whirls [*sic*] very swollen; sculpture very fine; spiral hollow inside keeled umbilicus. [Carpenter, 1864b, p. 653, no. 300] For Carpenter description, 1865e, see *M. rhodia* Dall in this paper.

Dall (1919, p. 365; 1921, p. 179) in renaming *M. inflata* Carpenter, 1864, specified that his new name *M. inflatulus* applied to the above reference and that the new name *M. rhodia* Dall (1921) applied to *M. inflata* Carpenter (1865e, p. 62). However, the separation of the species on the above references is not so simple as Dall indicated. Dall stipulated as type of *M. inflatulus* the specimens labelled "Puget Sound, collected by Dr. C. B. Kennerley" (Dall, 1919, p. 365). Since the description (1865e, p. 62) of *M. inflata* Carpenter and all Carpenter's references included material from Puget Sound (Kennerley), Vancouver (Lyall), and Neah Bay (Swan), Dall's selection of the Kennerley specimen from Puget Sound as type of *M. inflatulus* automatically makes the description of 1865e, as well as 1864b, in part reference to *M. inflatula*. Therefore the writer has, modified Dall's references to *M. inflata* Carpenter (in part) = *M. inflatulus* Dall and *M. inflata* Carpenter (in part) = *M. rhodia* Dall, in keeping with type material as indicated by Dall, rather than the specific date and page reference which he gave.

For remainder of discussion of *M. inflata* Carpenter, see *M. rhodia* Dall in this paper.

Specimens in U. S. National Museum, no. 4494, bears the label "type of *L. inflata* Carpenter pars = *inflatula* Dall. Type of both." This is the specimen indicated by Dall (1919, p. 365).

*Holotype*.—U. S. National Museum, no. 4494 (*M. inflata* Carpenter)

*Distribution*.—Puget Sound, Washington (type), Puget Sound, Washington, and Vancouver Island, British Columbia. (Carpenter)

**Margarites (Pupillaria) lirulatus** Carpenter

(Pl. 17, figs. 20, 21)

*Margarita lirulata* CARPENTER, 1864b, p. 603, 653; Reprint, 1872, p. 89, 139; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 61; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128 in part, including vars. and other Carpenter species; PILSBRY, 1889, Man. Conch., vol. XI, p. 296, pl. 65, figs. 81, 82, 87 including var. *subelevata*, *obsoleta* and *conica*.

*Margarites (Lirularia) lirulata* (Carpenter), DALL, 1921, p. 179; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 177; 1927, vol. II, pt. III, p. 207 not pl. 101, fig. 1 same as *M. lirulata conica* DALL, 1921; WILLETT in BURCH, 1942, no. 16, p. 3.

*Margarites lirulatus* (Carpenter), Grant and Gale, 1931, p. 841; KEEN, 1937, p. 39; BURCH, 1946, no. 58, p. 9; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 898, p. 202

"Small; operc. smooth: 2 sharp principal riblets on spire: outline variable." [Carpenter, 1864, p. 653]

The following line and concluding paragraph should be added to the copy of Carpenter's 1865 description published by Oldroyd (1927) to make the copy complete:

"*Hab.*—Puget Sd., *Kennerley*."

[Description of var. *subelevata*, *obsoleta* and *conica*, which see in this paper]

"The shells above described constitute what might be called a Darwinian group of specific forms. With the exception of the typical shells dredged by Dr. Kennerley, they are all in very bad condition. The Pugetian specimens are flattened, with open umbilicus, as might be expected from quiet water. Two specimens, however, form an exact transition to the Neeah Bay shells, of which a fair number (var.  $\alpha$ ) were sent by Mr. Swan, though worn and generally decorticated. They are more elevated, with fainter sculpture; and pass, by insensible gradations, into *M. tenuisculpta*, the two principal spiral lines becoming evanescent, and a few others intercalating. In this state (var.  $\beta$ ) the species can only be separated by the operculum, which is pale and thin, and destitute of the strongly expressed rib of the 'Vahlilii' group. A third form (var.  $\gamma$ ) would certainly claim specific rank, but for the intermediate series of  $\alpha$  and  $\beta$ . The diagnostic characters for the whole series are the smooth operculum, the eight narrow riblets round the base, with angular umbilicus and the sharp, narrow, principal riblets above, with wide interspaces, smooth except from the lines of growth, which are principally visible in the epidermis. There may be three (so-called) species in the group, viz.: *lirulata*, *subelevata* and *conica*." [Carpenter, 1865e, p. 61]

There are three specimens in the U. S. National Museum labelled "type Puget Sd. Dr. Kennerley." This label coincides with Carpenter's description. The middle-sized specimen of the three is figured herein.

*Syntypes*.—U. S. National Museum, no. 4191

*Distribution*.—Recent. Puget Sound, Washington (type); Port Etches, Alaska, to San Diego, California (Dall). Pleistocene (Grant and Gale; Waterfall, 1929). Pliocene (Waterfall, 1929)

**Margarites (Pupillaria) lirulatus conicus** Carpenter

*Margarita lirulata* var.  $\gamma$  *conica* CARPENTER, 1864b, p. 603, 653; Reprint, 1872, p. 89, 139; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 61; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128; PILSBRY, 1889, Man. Conch., vol. XI, p. 297

*Margarites (Lirularia) lirulata conica* (Carpenter), DALL, 1921, p. 180, pl. 17, fig. 1 type; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 177; BURCH, 1946, no. 58, p. 9

*Margarites (Lirularia) lirulata* (Carpenter), OLDROYD, 1927, vol. II, pt. III, pl. 101, fig. 1 same as Dall, 1921 *conica*

*Margarites conicus* (Carpenter), KEEN, 1937, p. 39

*Margarites lirulatus conicus* (Carpenter), BURCH, 1946, no. 59, p. 9

"... ? var. *conica*, very tall, with intercalary ribs, like *G. farcipicta*." [Carpenter, 1864b, p. 653]

"... ? var.  $\gamma$ . *conica*; t. valde elevata; lirulis acutis, aliis interdum intercalantibus; umbilicus parvo. Long. .33, long. spir. .2, lat. .25, div. 58°.

"*Hab.*—Puget Sd., *Kennerley*, sp. un." [Carpenter, 1865e, p. 61]

The holotype in the U. S. National Museum has the label "unique type Puget Sd. Kennerley." It was figured by Dall (1921).

*Holotype*.—U. S. National Museum, no. 4191a

*Distribution*.—Puget Sound, Washington (type)

**Margarites (Pupillaria) lirulatus obsoletus (Carpenter)**

(Pl. 17, figs. 18, 19)

*Margarita lirulata* var. *obsoleta* CARPENTER, 1864b, 603, 653; Reprint, 1872, p. 89, 139; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 61; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128; PILSBRY, 1889, Man. Conch., vol. XI, p. 297

*Margarites (Lirularia) lirulata obsoleta* CARPENTER, DALL, 1921, p. 180; OLDRYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 177; 1927, vol. II, pt. III, p. 208

*Margarites obsoletus* CARPENTER, KEEN, 1937, p. 39

*Margarites lirulatus obsoletus* CARPENTER, BURCH, 1946, no. 58, p. 9.

"... var. *obsoleta*, sculpture evanescent:" [Carpenter, 1864b, p. 653]

"... var.  $\beta$  *obsoleta*; t. ut in ? var. *subelevata*; lirulis evanescentibus; operculo planato, tenuissimo, suturis indistinctis.

"Hab.—Neeah Bay, Swan." [Carpenter, 1865e, p. 61]

The syntypes consist of 8 specimens in the U. S. National Museum. The apices of all are rough and except in one young individual are worn. There are about three rough spiral ribs over the whorls of the spire, depending on age, with a smooth or roughened surface between the ribs; three spiral ribs over the body whorl above the basal carina; below the carina they are coarse but finer than the ribs above the carina. The label reads "Types, Neeah Bay, W. T. J. G. Swann."

Syntypes.—U. S. National Museum, no. 15537e

Distribution.—Neeah Bay, Washington (type)

**Margarites (Pupillaria) lirulatus subelevatus Carpenter**

(Pl. 17, figs. 16, 17)

*Margarita lirulata* var.  $\alpha$  *subelevata* CARPENTER, 1864b, p. 603, 653; Reprint, 1872, p. 89, 139; CARPENTER, 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 61; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128; PILSBRY, 1889, Man. Conch., vol. XI, p. 297

*Margarites (Lirularia) lirulata subelevata* (Carpenter), DALL, 1921, p. 180, OLDRYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 177; 1927, vol. II, pt. III, p. 208

*Margarites subelevatus* (Carpenter), KEEN, 1937, p. 39

*Margarites subelevatus* (Carpenter), BURCH, 1946, no. 58, p. 10

"... Var. *subelevata*, raised, livid:" [Carpenter, 1864b, p. 653]

"? Var.  $\alpha$ . *subelevata*; t. elatiore; colore livido, intensiore; lirulis vix acutis.

"Hab.—Puget Sd., Kennerley, Neeah Bay, Swan." [Carpenter, 1865e, p. 61]

The type material consists of 12 specimens. The largest measures 7 mm. height and 6.5 mm. greatest diameter; the smallest measures 3 mm. height and 2.5 mm. greatest diameter. The label reads as follows: "Types, Neeah Bay, W. T. J. G. Swan."

Syntypes.—U. S. National Museum, No. 15537

Distribution.—Neeah Bay, Washington, (type); Neeah Bay, Washington, to San Pedro, California (Burch)

**Margarites (Pupillaria) optabilis (Carpenter)**

*Gibbula optabilis* CARPENTER, 1864b, Aug., p. 612, 653; Reprint, 1872, p. 98, 139; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 214; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128 under *M. lirulata*; PILSBRY, 1889, Man. Conch., vol. XI, p. 297 under *M. lirulata*

*Margarites (Lirularia) optabilis* (Carpenter), DALL, 1921, p. 179, pl. 17, fig. 7, type; OLDRYD, 1927, vol. II, pt. III, pl. 101, fig. 6 same as DALL, 1921 not pl. 108, fig. 6 as stated; WILLETT in BURCH, 1942, no. 16, p. 3

*Margarites optabilis* (Carpenter), KEEN, 1937, p. 39; BURCH, 1946, no. 58 p. 9; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 202

*Margarites (Pupillaria) optabilis* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper, 207, p. 62

"Wider: decussated between ribs: 2 spiral lines inside umbilicus." [Carpenter, 1864b, p. 653]

"G. t. parva, pulcherrima, subconica; lurida, fusco-purpureo maculata; anfr. v. sub quadratis, suturis distinctis; carinis principalibus in spira ii, alia intercalante; carina fortiori peripherali, et lirulis circ. VI. basalibus, regulariter colore punctatis; lira postica subobsolete suturam attingente; aliis minoribus intercalantibus; interstitiis ubique tenerrime et cre-

berrime decussatis; basi subtumente, ad carinam peripherialem fere rectangulato; apertura subquadrata, columella parum arcuata; umbilico magno, infundibuliformi, angulato; liris ii. intus spiraliter ascendentibus.

"Long. 0.19, long. spir. 0.10, lat. 0.19, div. 80°.

"*Hab.* San Pedro, *Palmer*, one specimen." [Carpenter, 1866a, p. 214]

The holotype of this species is labelled, "unique type San Pedro Palmer," which coincides with Carpenter's description (1866a, p. 214).

Although the explanation of the figure is not so labelled (Dall, 1921, pl. 17, fig. 7), the illustration by Dall is probably a drawing of the holotype. The measurements are the same, and the specimen is labelled, "fig'd."

*Holotype*.—U. S. National Museum, no. 15287

*Distribution*.—Recent. San Pedro, California (type); Santa Barbara, California, to Coronado Islands, California (Kelsey in Burch). Pleistocene (Woodring, Bramlette, and Kew)

### Margarites (*Pupillaria*) *parcipictus* (Carpenter)

(Pl. 17, figs. 5, 6)

*Gibbula parcipicta* CARPENTER, 1864b, Aug., p. 627, 653; Reprint, 1872, p. 113, 139; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 426; Reprint, 1872, p. 238; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128 under *M. lirulata*; PILSBRY, 1889, Man. Conch., vol. XI, p. 297 under *M. lirulata*  
*Margarites (Lirularia) parcipicta* (Carpenter), DALL, 1921, p. 179, ref. "Proc. Cal. Acad. Sci., vol. 3, p. 157," change to p. 158; for proper reference see above; pl. 17, fig. 3 not good representation, ABBOTT, 1954, fig. 31e is the same fig; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 177; pl. 47, fig. 2 same as DALL, 1921; OLDROYD, 1927, vol. II, pt. III, p. 199 see note after DALL, 1921, for references; pl. 101, fig. 4 same as DALL, 1921

*Margarites parcipictus* (Carpenter), KEEN, 1937, p. 39; BURCH, 1946, no. 58, p. 9; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 202

*Margarites (Pupillaria) parcipictus* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper, 207, p. 62

"Like strong growth of *Marg. lirulata*, var." [Carpenter, 1864, p. 653]

The following lines should be changed in the copy of Carpenter's description (1864, Dec.) as republished by Oldroyd (1927) to make the copy of that description complete:

Delete "poll".

Add:

"—div. 70°.

"*Hab.* Neeah Bay (*Swan*); Santa Cruz (*Rowell*)." [Carpenter, 1864d, p. 426]

Oldroyd included a translation of Carpenter's Latin description.

The holotype in U. S. National Museum labelled "type" is the second specimen mentioned by Carpenter. The shell is labelled "Santa Cruz, Cal. Rowell." Since the first mentioned specimen, "Neeah Bay," is apparently not now available, the type locality becomes Santa Cruz instead of Neeah Bay, as stipulated in Oldroyd (1927) and Burch (1946).

Dall's (1921) drawing and the photograph of the type, herein included do not represent the same shell, or the drawing does not depict wholly the characters of the specimen. The holotype has only two primary spiral ribs on the whorls of the spire, as described by Carpenter; six basal spirals including the carina are on the body whorl; all the spirals are crossed by conspicuous longitudinal striations. These are not illustrated on Dall's figure.

*Holotype*.—U. S. National Museum, no. 31114

*Distribution*.—Santa Cruz (Island),<sup>54</sup> California (type); Sitka, Alaska, to San Martin Island and to Guadalupe Island, Mexico (Burch)

<sup>54</sup> If the locality "Santa Cruz" of Carpenter's description (1864d, Dec., p. 426) is intended to supplement the locality data 1864b, Aug., p. 653), then Santa Cruz is the island of Santa Cruz, Santa Barbara Channel. The locality list in the latter reference included only the Farallon Islands and Santa Barbara group, other than Vancouver.

**Margarites (Pupillaria) rhodia**<sup>55</sup> Dall

*Margarita inflata* CARPENTER, 1864b, p. 603, 653; Reprint, 1872, p. 89, 139 in part; 1865, Acad. Nat. Sci. Philadelphia, Proc. vol. 17, p. 62 in part = *M. rhodia* DALL, 1921, p. 179, pl. 17, fig. 4 type; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26 in part  
*Margarita pupilla* Gould, DALL, 1871, Amer. Jour. Conch., p. 127 in part  
 Not *M. inflata* TOTTEN, 1834, BROWN, 1839, or MORRIS, 1854, see under *M. inflatulus* Dall for references

*Margarites (Pupillaria) rhodia* DALL, 1921 (not 1920 as in DALL), p. 179, pl. 17, fig. 4 lectotype; OLDROYD, 1927, vol. II, pt. III, p. 204, pl. 101, fig. 5 same fig. as DALL, 1921; KEEN, 1937, p. 39; BURCH, 1946, no. 58, p. 7

"Thin, whirls [*sic*] very swollen; sculpture very fine; spiral hollow inside keeled umbilicus." [Carpenter, 1864b, p. 653]

In part, see also under *M. inflatulus* Dall.

The following line should be added to Oldroyd's (1927) copy of Carpenter's description (1865):

"*Hab.* Puget Sound, Kennerley, Vancouver, Lyall, Neeah Bay, Swan.

"Only two adult specimens of this remarkably elegant species have been seen. It resembles the shell from Greenland called *M. striata*, *Brod. and Sby.*, in the British Museum, but that under the same name from Behring Straits appears distinct. In many respects it is like *M. undulata*, but differs in the greater swelling of the whorls meeting at a nearly rectangular suture, in the far more delicate sculpture without waves the keeling of the umbilicus and the bend in the pillar which causes a slight spiral hollow inside the umbilical rib." [Carpenter, 1865e, p. 62]

In the U. S. National Museum specimen no. 5332 = 15585 is labelled "*M. inflata* Cpr. Puget Sd." Another label with the same specimen reads "15585 Cotype *M. inflata* Neeah Bay W. T. J. G. Swan." "= *M. rhodia* Dall" is in pencil on the label. On the underside of the label is written, "One of the typical specimens Proc. Ac. Nat. Sci. Phila. Apr. 1865 p. 62."

Carpenter's description (1865) stipulated specimens from Puget Sound collected by Kennerley and Neah Bay collected by Swan. Dall (1919) definitely selected the Kennerley specimen from Puget Sound as the type of *M. inflatulus* Dall (*M. inflata* Carpenter in part). The above notes reveal that the Swan specimen from Neah Bay Dall designated as the type of *M. rhodia*. He did not indicate (1921, pl. 17) that the specimen figured was the type, but since there was only one specimen the figured shell would certainly be the Swan specimen. See the discussion under *M. inflatulus* Dall.

*Dimensions*.—Lectotype: height, 10 mm. and greatest diameter, 11 mm.

*Lectotype*.—U. S. National Museum, no. 15585

*Distribution*.—Neah Bay, Washington (type); Port Althorp, Alaska, to San Diego, California (Dall)

**Margarites (Pupillaria) salmoneus** (Carpenter)

*Margarita* (? var.) *salmonca* CARPENTER, 1864b, Aug., p. 612, 653, Reprint, 1872, p. 98, 139; 1864, July-Dec., California Acad. Sci., Proc., vol. III, p. 158; PILSBRY, 1889, Man. Conch., vol. XI, p. 295 under *M. pupilla* Gould; DALL, 1921, p. 178, pl. 18, fig. 6, 9 type; OLDROYD, 1927, vol. II, pt. III, p. 203

*Margarita pupilla* var. *salmonea* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 127 in part

*Margarites (Pupillaria) salmoneus* (Carpenter), KEEN, 1937, p. 39; BURCH, 1946, no. 58, p. 7

*Margarites salmoneus* (Carpenter), SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 202

"Between *pupilla* and *undulata*: salmon-tinted, sculpture fine, not decussated: sutures not waved. 6-40 fm. *Cp.*" [Carpenter, 1864b, p. 653]

The following paragraphs should be added to the copy of Carpenter's description (1864e, p. 158) (as republished by Oldroyd (1927)):

<sup>55</sup> The specific name is left in the feminine because the writer is not sure of its origin.

"*Hab.* Monterey, 6-20 fms. 5, alive; Catalina Island, 30-40 fms. 2, alive.

"This shell differs from the common *Margarita* of the Vancouver district (*M. pupilla* Gld. = *calliostoma* A. Ad.), in its much deeper and salmon-tinted hue; its finer sculpture, absence of decussation, and want of distant lirae round the umbilicus. From the Norwegian specimens of *M. undulata* it is known by the absence of sutural waves, and by the finer basal riblets, of which the interstices are minutely sculptured across. The operculum differs from both, in its great thinness and smoothness. Additional specimens may better display its true relations."\* [Carpenter, 1864e, July-Dec., p. 158]

\*Specimens from Monterey, and one from the beach of the Farallone Islands, are intermediate between that described by Mr. Carpenter (Catalina Island specimen) and the northern *M. pupilla*. J. G. Cooper

Oldroyd included a translation of Carpenter's Latin description.

Dall (1921) published a drawing of the holotype. The printed label of that specimen reads "Monterey, Cal. Cooper."

*Holotype*.—U. S. National Museum, no. 16279

*Distribution*.—Monterey, California (type); Puget Sound, to Cayucos, California, San Luis Obispo County, California (Burch)

#### "Section" *Lirularia* Dall, 1909

*Lirularia* DALL, April 1909, U. S. Geol. Sur., Prof. Paper, 59, p. 98.

Type species by original designation, *Margarita lirulata* CARPENTER, 1864b, p. 653; Acad. Nat. Sci. Philadelphia, Proc., vol. 17, 1865, p. 61. Recent. Port Etches, Alaska, to San Diego, California (Pl. 17, figs. 20, 21)

Dall originally described *Lirularia* as a section of the subgenus *Pupillaria*. In 1921 he raised the group to subgeneric rank. This classification has been followed by authors but apparently not with conviction that it is correct (Grant and Gale, 1931, p. 839; Burch, 1946, no. 58, p. 8). In analyzing such segregation as *M. rhodia* Dall in *Pupillaria* and *M. inflatus* Dall in *Lirularia*, the writer does not see justification for the importance of subgeneric rank of *Lirularia*. The writer therefore returns to its use as a section and is aware that sections have no nomenclatorial status in the International Rules of Zoological Nomenclature, except that the International Commission agreed to recommend that such groups be treated as having subgeneric status. (Bull. Zool. Nomen., vol. 4, pts. 13-15, 1950, no. 9, p. 441-443).

#### *Margarites* (*Pupillaria*) *succinctus* Carpenter

*Gibbula succincta* CARPENTER, 1864b, Aug., p. 627, 653; Reprint, 1872, p. 113, 139; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 426, 427; Reprint, 1872, p. 238; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 128 under *M. lirulata*; PILSBRY, 1889, Man. Conch., vol. XI, p. 297 under *M. lirulata*

*Margarites* (*Lirularia*) *succincta* (Carpenter), DALL, 1921, p. 179, pl. 17, fig. 9 type; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 176, pl. 45, fig. 11 same as DALL, 1921; 1927, vol. II, pt. III, p. 205; WILLETT in BURCH, 1942, no. 16, p. 3

*Margarites succinctus* (Carpenter), KEEN, 1937, p. 39; BURCH, 1946, no. 58, p. 8; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 202

*Margarites* (*Pupillaria*) *succinctus* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper, 207, p. 62

"Small, scarcely sculptured, with spiral brown pencillings." [Carpenter, 1864b, p. 653]

The following line should be added to Oldroyd's copy (1927) of Carpenter's description (1864d, p. 427):

"*Tab.*—Neah Bay (*Swan*); Lower California, on *Haliotis* (*Rowell*)."  
[Carpenter, 1864d, p. 427]

The syntypes consist of three specimens; according to their label they are the specimens Rowell got on the *Haliotis* in Lower California. The Neah Bay specimen is apparently not available. The type locality is, therefore, Lower California although not definitely stated where in that area.

The largest of the syntypes was figured by Dall (1921). The measurement given by Dall (explanation pl. 17, fig. 9) is 1 mm. larger than the writer's measurement. The specimens have a large umbilicus. Numerous spiral ribs are present over the whorls, largest on the posterior part of the whorls.

*Dimensions*.—Height: 4 mm., 3 mm., 2 ± mm.; greatest diameter: 4 mm., 3 mm., 2 ± mm., respectively

*Syntypes*.—U. S. National Museum, no. 15562

*Distribution*.—Recent. Lower California on *Haliotis* (type); Sitka, Alaska, to San Martin Island, Lower California (Burch). Pleistocene (Woodring, Bramlette, and Kew)

Genus *Cidarina* Dall, 1909

*Cidarina* DALL, 1909, U. S. Geol. Sur., Prof. Paper, 59, p. 98

Type species by original designation, *Margarita [cs] cidaris* (A. ADAMS in CARPENTER), 1864b, Aug., p. 653. Recent. Alaska, to Cape San Quentin, Lower California (Pl. 17, fig. 13)

*Cidarina cidaris* (Adams in Carpenter)

(Pl. 17, fig. 13)

*Margarita cidaris* CARPENTER, 1864b, Aug., p. 627 "n.s.", 653 "A. Ad. n.s.;" Reprint, 1872, pp. 113, 139; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 426; Reprint, 1872, p. 238; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; 1888, 7th Ann. Rept. California State Min., p. 249; 1894, California State Min. Bur. Bull. 4, pt. 3, p. 27

*Turricula* (?) *cidaris* (A. Adams, Carpenter), PILSBRY, 1889, Man. Conch., vol. 11, p. 331, copy original description

*Solariella oxybasis* DALL, 1889, U. S. Nat. Mus., Proc., vol. 12, no. 773, p. 352, pl. 2, fig. 6 *vide* COOPER, 1894, and DALL, 1921 [Young]

*Solariella cidaris* (A. Adams), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 202, pl. XXII, fig. 4; ARNOLD, 1903, p. 334 in part ? pl. VII, fig. 11

*Solariella cidaris* Carpenter, TAYLOR, 1895, Roy. Soc. Canada, Trans., ser. 2, vol. 1, sec. IV, p. 91

*Cidarina cidaris* (A. Adams), DALL, 1909, U. S. Geol. Sur., Prof. Paper 59, p. 98; 1921, p. 177; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 173, pl. 5, fig. 16; 1924b, vol. 11, pt. III, p. 193, pl. 91, fig. 7 same fig. as 1924, pl. 5, fig. 16; GRANT AND GALE, 1931, p. 838, pl. 32, fig. 22; KEEN, 1937, p. 33; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 202

*Cidarina cidaris* (Carpenter), BURCH, 1946, no. 58, p. 5

*Lischkeia cidaris* (Carpenter), ABBOTT, 1954, p. 109, fig. 31h, same fig. as WILLIAMSON, 1892

"———, A. Ad. n.s. Large, knobby, like thin *Turcica*, with simple pillar and small umbilicus." [Carpenter, 1864b, p. 653]

Oldroyd republished (1924) Carpenter's description (1864b, Dec.) of this species. The following corrections should be made in her copy:

Delete second "carinatus," lines 4 and 5 of description.

"Hab. Neeah Bay (Swan)

"Mr. A. Adams suggested the above expressive name for this very remarkable and unique shell." [Carpenter, 1864d, p. 426]

It is not expedient nor true to credit this species wholly to Adams as is commonly done. Adams suggested the name, but Carpenter executed the description. Credit to Adams alone when it is not in a publication by that author may be confusing, even though the original reference is given in Dall (1921) and Oldroyd (1924).

A similar case is that of *Assiminea grayana* Fleming (Leach in Fleming, 1828), type species of *Assiminea* Fleming (Leach in Fleming), which see. Leach sent Fleming a specimen so labelled which Fleming acknowledged in his description of the new species, new genus. Thus Leach would be the author of *Assiminea*. However, Fleming is rightfully stipulated in literature as the author.

The holotype has a label "Margarita cidaris A. Ad. Type Neeah Bay, W. T. J. G. Swan."

*Holotype*.—U. S. National Museum, no. 15600

*Distribution*.—Recent. Neah Bay, Washington (type); Kasaan Bay, Alaska, to Cape San Quentin, Lower California (Dall). Pleistocene. California (Arnold; Grant and Gale; Woodring, Bramlette, and Kew, p. 62). Pleistocene or Pliocene. California (Carpenter in Cooper, 1888; Grant and Gale)

Genus *Solariella* S. Wood, 1842*Solariella* S. Wood, 1842, Ann. Mag. Nat. Hist., vol. 9, p. 531Type species by monotypy *S. maculata* S. Wood, Ann. Mag. Nat. Hist., vol. 9, pl. V, figs. 7, 10. Pliocene. England. S. Wood, 1848, Palaeont. Soc., Mon. Crag. Moll., vol. 1, Univalves, p. 135, pl. XV, fig. 3*Solariella peramabilis* Carpenter

(Pl. 17, figs. 3, 4)

*Solariella peramabilis* CARPENTER, 1864b, Aug., p. 612, 653; Reprint, 1872, p. 98, 139; 1864e, July-Dec., California Acad. Sci., Proc., vol. III, p. 156; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; PILSBRY, 1889, Mar. Conch., vol. XI, p. 312, pl. 67, figs. 59-61; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 202; DALL, 1921, p. 177, pl. 17, fig. 8 probably type; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 174, pl. 5, fig. 13; 1927, vol. II, pt. III, p. 195, pl. 91, fig. 8; pl. 101, fig. 7 both same as DALL, 1921; GRANT AND GALE, 1931, p. 839; KEEN, 1937, p. 46; BURCH, 1946, no. 58, p. 5; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 202; ABBOTT, 1954, p. 111, fig. 31b same fig. as DALL, 1921.

"Subgenus of *Margarita*, with open, crenated, umbilicus. Species most ornate, with delicate sculpture. Umbilicus with 3 internal spiral lines, crossed by lirulæ; operculum sculptured. Like *Minolia aspecta*, A. Ad. 40-120 fm. living. *Cp.*" [Carpenter, 1864b, p. 653]

"*S. t. tenuissima*, elegantissime sculpta, livida, rufusco pallide maculata; anfr. nucl. ii valde tumidis, laevibus, apice mammillato; dein anfr. norm. IV Tabulatis, suturis fere rectangularibus, supra spiram bi-seu tri-carinatis, carinulis aliis postea intercalantibus; tota superficie elegantissime et creberrime radiatim lirulata, lirulis acutissimis, extantibus, supra carinas subgranulosis, interstitia anfr. primis fenestrantibus, postea decussantibus; basi valde rotundata; carinulis circ. v., antica granulosa, sculpta; umbilico maximo, anfractus intus monstrante, lineis spiralibus circ. iii distantibus, et lirulis radiantibus à basi continuis, concinne ornato; apertura rotundata, à carinulis indentata, vix parieti attingente, intus iridescente, naerea: operculo tenuissimo, multispirali, anfr. circ. x., radiatim eleganter rugulosis.

"Long. 0.38, long. spir. 0.19, lat. 0.42, div. 85°.

"*Hab.* Catalina Island, 30-120 fms. 20, both alive and dead.

"The name *Solariella* given to a crag fossil (tertiary) species by Searles Wood, which he afterwards reunited to *Margarita*, is here used as a subgenus, in the author's sense, for *Margaritæ* with large crenated umbilicus. This is one of the many instances in which the North Pacific fauna carries out the ideas of the English crag. Unfortunately, the same appears in Add. Gen. I, 431, for a subgenus of *Monilea*, with which these shells have only a limited affinity; and, accordingly, the true *Solariellæ* have been reconstituted as part of *Minolia*, A. Ad. That gentleman, however, fully accords with the present arrangement. The *Solariellæ* are known from *Trochiscus*, and from all forms of *Solariadæ*, by the normal (not inverted) nuclear whorls [*sic*]; and from the Solarids, by the nacreous texture.

"Dr. Cooper's very lovely species of a very lovely group may possibly prove to be a variety of the Japanese '*Minolia aspecta* A. Ad.' ms. in Mus. Cuming; but, until more specimens from each district have been compared, it is more prudent to keep them separate. It seems to have exhausted the powers of sculpture on its graceful habitation. Under the microscope, the sharp transverse lirulæ, mounting over the keels, dividing the interspaces, and even ascending the wide umbilicus, are eminently beautiful. Even the operculum is sculptured with delicate waved radiating lines. It has the aspect of an extremely thin *Torinia*, with a funnel-shaped umbilicus. This is not only bounded by a granular keel, but has three other distant spiral lines crossing the lirulæ. The radiating sculpture is more distant on the upper whorls, where first two, then three keels appear, fenestrated by the lirulæ, which afterwards become much closer, and are sometimes worn away behind the labrum." [Carpenter, 1864e, July-Dec., p. 156]

Pilsbry (1889) translated Carpenter's description (1866) and republished a portion of the English. Oldroyd republished Pilsbry's translation. The drawing published by Dall (1921) is apparently a figure of the lectotype, but it is not exact in details. The longitudinal ribs are stronger than in the Dall drawing as may be seen by comparing the photograph of the holotype herein included. There is one specimen in the U. S. National Museum labelled "Cotype Catalina Id. Cooper." Since there would, therefore, have been more than one type at sometime, the existing type is a lectotype.

*Lectotype*.—U. S. National Museum, no. 16281



*Distribution*.—Recent. Catalina Island, California (type). Forrester Island, Alaska, to San Diego, California, and the Coronado Islands, California, also Japan (Dall).<sup>56</sup> Pleistocene (Arnold). Pliocene (Waterfall, 1929)

Genus *Calliostoma* Swainson, 1840

*Calliostoma* SWAINSON, 1840, Treatise on Malacology, p. 218, 351

Type species by subsequent designation, HERMANNSEN, 1846, Indicis Generum Malacozoorum, vol. 1, p. 154, *Trochus conulus* LINNAEUS, 1758, Syst. Nat. X, p. 759; XI, 1767, p. 1230 = in SWAINSON, 1840, *T. conula* Mart. 166. f. 1588 fide HANLEY, 1855, Ipsa Linn. Conchyl., p. 322; Living. Mediterranean. PILSBRY, 1889, Man. Conch., vol. XI, pl. 65, figs. 70-72

*Calliostoma costatum laqueatum* Carpenter, ms.

The holotype of this nude name is in the U. S. National Museum, no. 15478. It is labelled, "Neah Bay, J. G. Swan." The name was never validated by Carpenter.

*Calliostoma gemmulatum* Carpenter

(Pl. 17, figs. 7, 8)

*Calliostoma formosum* CARPENTER, 1864e, Dec., California Acad. Sci., Proc., vol. III, p. 156

*Calliostoma gemmulatum* CARPENTER, 1864b, Aug., p. 612, 653; Reprint, 1872, p. 98, 139; 1866, California Acad. Sci., Proc., vol. III, p. 215 new name for *C. formosum* Carpenter not Forbes; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; PILSBRY, 1889, Man. Conch., vol. XI, p. 371, pl. 67, fig. 54; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 201, pl. XII, fig. 3; ARNOLD, 1903, p. 330; DALL, 1921, p. 176; OLDROYD, 1927, vol. II, pt. III, p. 189; GRANT AND GALE, 1931, p. 835; KEEN, 1937, p. 32; BURCH, 1946, no. 57, p. 30, 32; no. 58, p. 3; ABBOTT, 1954, p. 115, fig. 33d same fig. as WILLIAMSON, 1892

"Very swollen; painted like *eximium*: with 2 principal and 2 smaller rows of granules." [Carpenter, 1864b, Aug., p. 653]

"... State Collection 615a.

"*C. t. subelevata*, brunnescens, fusco-purpureo nebulosa, anfr. VII valde tumentibus, suturis impressis; carinis majoribus in spira duabus, gemmatis, interdum brunneo huc et illuc tinctis; serie granulorum minorum prope suturam; serie quarta minimorum inter duas carinas; lirulis basalibus circ. IX., fusco maculatis; interstitiis à lineis incrementi corrugatis; apertura subquadrata. Long. 0.47, long. spir. 0.34, lat. 0.43, div. 68°.

"*Hab.* San Pedro five; San Diego four dead on beach at low water—very rare. It is well distinguished by the two principal necklaces, with smaller rows intercalating. In coloring it resembles *C. eximium* Reeve (versicolor Menke, Mazatlan, Catal.), from the Gulf of California. [Carpenter, 1864e, Dec., p. 156, *C. formosum*]

"*Calliostoma gemmulatum*, Cpr. Br. Assoc. Rep. 1863, pp. 612, 653.

"*Syn. C. formosum*, Cpr. Proc. Cal. Ac. 1864, 155: non Forbes.

"While the sheets of the Report were passing through the press, it was found that the name had been preoccupied by Forbes. As it happened the Californian sheet was being printed simultaneously, and there was no time to make the alteration." [Carpenter, 1866a, p. 215]

Carpenter's statement (preceding paragraph) settles the question that *C. gemmulatum* is the new name for *C. formosum* Carpenter and not for *C. supragranosum* Carpenter (1866a, p. 214), as indicated by Pilsbry (1889, p. 370)<sup>57</sup> and followed by Grant and Gale (1931, p. 836).

The writer made the following notes regarding the specimen labelled type in the U. S. National Museum and figured herein:

Nucleus is present, composed of about two and a half smooth whorls, followed by about three-quarters of a whorl which bears faint spiral ribs; the following whorls are sculptured with three large nodose spiral ribs, middle rib largest, the posterior the smallest on the whorls of the spire; faint spiral striae are present just above the suture. The body is carinated at base with four large nodose spirals above; shoulder spiral is largest, with the smallest just

<sup>56</sup> Modified. Keen, (1941, p. 481). Tadashige Habe, June 22, 1955, personal communication, stated that this species has not been found since the original discovery.

<sup>57</sup> Apparently there is a conflict in references in Pilsbry (1889, p. 370, 371), for *C. formosum* is also properly listed in *C. gemmulatum* Carpenter. Page 155 should be page 156 in *C. formosum* Carpenter reference.

below; faint revolving striae are below the first posterior nodose spiral. All revolving ribs are crossed by longitudinal striae. The 10 or 11 basal spirals are not nodose.

The validity of the holotype status of the specimen so labelled in the U. S. National Museum is doubtful or there has been an error in the labeling. The specimen bears a printed label "Catalina Id. Cooper type." The only localities mentioned by Carpenter in the original notes are San Pedro and San Diego. Original San Pedro or San Diego material is not available; hence it is difficult to choose a lectotype to replace the "Catalina Id." shell. The specimen catalogued as type is no. 16261, U. S. National Museum.

*Type*.—See above

*Distribution*.—Recent. San Pedro or San Diego, California (type); Cayucos, San Pedro, California, to Gulf of California (Burch). Pleistocene (Arnold; Grant and Gale). Pliocene (Arnold)

### *Calliostoma splendens* Carpenter

(Pl. 17, figs. 11, 12)

*Calliostoma splendens* CARPENTER, 1864b, Aug., p. 612, 653; Reprint, 1872, p. 98, 139; 1864, July-Dec., California Acad. Sci., Proc., vol. III, p. 156; COOPER, 1867, Geog. Cat. Moll., Geog. Sur. California, p. 26; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 126 young of *C. costatum* Martyn; PILSBRY, 1889, Man. Conch., vol. XI, p. 362, 363 young of *C. costatum* Martyn following Dall; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 201, pl. XXI, fig. 5; DALL, 1921, p. 177; OLDROYD, 1927, vol. II, pt. III, p. 182, pl. 98, fig. 1 same as WILLIAMSON, pl. XXI, fig. 5; GRANT AND GALE, 1931, p. 837; KEEN, 1937, p. 32; BURCH, 1946, no. 57, p. 29, 32; no. 58, p. 3; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 202; ABBOTT, 1954, p. 116, fig. 33c same fig. as WILLIAMSON, 1892

"Orange chestnut with fleshy naere; small, rather flattened, base glossy. 6-40 fm. *Cp.*" [Carpenter, 1864b, p. 653]

The following lines should be changed in Oldroyd's (1927) copy of Carpenter's description (1864, p. 156):

Delete "poll" and add, div. 87°.

Add:

"*Hab.* Monterey, 20 fms. dredged 2, dead; Santa Barbara, in roots of kelp growing in about 10 fms. 13, dredged in 16 fms., 2 dead; S. B. Island, 2, dead, on beach; Catalina Island, 30-40 fms. 2, alive; San Diego, 1, dead.

"The specimens here described are probably mature, and are well marked in character. The painting is richly lustrous, of a fleshy naere inside; outside, of a rich orange-chestnut or red, variously laid on a light ground, sometimes with streaks of nacreous purple, often with dots on the ribs. The operculum is extremely thin and transparent." [Carpenter, 1864e, p. 156]

The syntypes have the printed label, "Type Catalina Id. Cooper." There are two specimens with the following dimensions, respectively: 5 mm. height and 5 mm. greatest diameter; 3 mm. height and 3.5 mm. greatest diameter. The larger of the two specimens is figured herein.

*Syntypes*.—U. S. National Museum, no. 16278

*Distribution*.—Recent. Catalina Island, California (type); Monterey, California, to Guadalupe Island, Mexico (Strong and Hanna in Burch). Pleistocene (Grant and Gale)

### *Calliostoma supragranosum* Carpenter

(Pl. 17, figs. 14, 15)

*Calliostoma supragranosum* CARPENTER, 1864b, p. 612, 653; Reprint, 1872, p. 98, 139; 1866, California Acad. Sci., Proc., vol. III, p. 214; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; PILSBRY, 1889, Man. Conch., vol. XI, p. 369, pl. 67, fig. 71; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 201; DALL, 1921, p. 176; OLDROYD, 1927, vol. II, pt. III, p. 189; GRANT AND GALE, 1931, p. 836 in part; KEEN, 1937, p. 32; BURCH, 1946, no. 57, p. 30, 32; no. 58, p. 3; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 62 Pleistocene; ABBOTT, 1954, p. 115, pl. 18, figs.

"Swollen, with sharp ribs; posterior 1-4 granular." [Carpenter, 1864b, p. 653]

"*C. t. parva*; anfr. v. tumentibus; liris acutis cincta, quarum mediae laeves, posticae granosae, basales IX minores.

"*Hab.* San Diego; Cooper.

"The single specimen sent differs as above from the young of the next species." [*C. gemmulatum*] [Carpenter, 1866a, p. 214]

The holotype has the label, "Type San Diego Cp."

From an examination of the holotype this species is like a superaccelerated *C. splendens* in the number of ribs and retention of beaded ribs. The nucleus consists of one or one and a half smooth bulbous whorls followed by coarsely ribbed whorls; after about one whorl there are three coarse spirals, and the spiral ribs are more strongly beaded on the shoulder of the whorl; 6 spirals on the penultimate whorl and 11 on the body whorl with a basal carina; 10 plain spiral ribs on the base.

*Holotype*.—U. S. National Museum, no. 14925

*Distribution*.—Recent. San Diego, California (type); Monterey, California, south to Pequeña Bay, Lower California (Burch). Pleistocene (Chace; Woodring, Bramlette, and Kew)

### *Calliostoma variegatum* Carpenter

(Pl. 17, fig. 9, 10)

*Calliostoma* (? var.) *variegatum* CARPENTER, 1864b, p. 603, 652; Reprint, 1872, p. 89, 138; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 61; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 26; PILSBRY, 1889, Man. Conch. vol. XI, p. 364

*Calliostoma variegatum* Carpenter, DALL, 1902, U. S. Nat. Mus., Proc., vol. XXIV, p. 552, pl. XXXIX, fig. 10; 1921, p. 176; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 172; 1927, vol. II, pt. III, p. 185, pl. 100, fig. 10 same as DALL, 1902, pl. XXXIX, fig. 10; KEEN, 1937, p. 32; BURCH, 1946, no. 57, p. 30, 32; no. 58, p. 2; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 202; ABBOTT, 1954, p. 116, fig. 33b same fig. as Dall, 1902

"Small, more conical, nodules more distant, white on rosy ground." [Carpenter, 1864b, p. 652]

The following should be changed in the copy of Carpenter's description (1865) published by Oldroyd (1927).

"Correct "13" to read "13."

Add:

"*Hab.*—Puget Sd., sp. un legit Kennerley. This may prove to be an extreme variety of *Cal. annulatum*, *Martyn*." [Carpenter, 1865e, p. 61]

The holotype is a beautiful specimen with a tiny entire rosy protoconch consisting of one or more smooth bulbous whorls with an indistinct line of demarcation followed by a large rough whorl with spiral ribs, but the ribs are not nodose; the nodosity begins on the following ribs. On the body whorl there is a fourth nodose interradial which on the whorls of the spire is a faint cord; the nodes are white with brownish internodes.

The label of the holotype bears the following printed label, "Puget Sound, W. T. Dr. Kennerly [sic] Type."

*Holotype*.—U. S. National Museum, No. "4201?"<sup>58</sup>

*Distribution*.—Puget Sound, Washington (type); Forrester Island, Alaska, to Cerros Island, Lower California (Burch).

### Genus *Tegula* Lesson, 1835

*Tegula* LESSON, 1835,<sup>59</sup> Illustrations de Zoologie, liv. 17, pl. 51

Type species by monotypy *Tegula elegans* LESSON, 1835, Illustrations de Zoologie, liv. 17, pl. 51, figs. 1, 2, A, and description = *Trochus pellis-serpentis* Wood, 1828, Suppl. Index Testaceologicus, pl. 5, fig. 4a. Recent. West Coast Central America—Gulf of California. PILSBRY, 1889 Man. Conch., vol. XI, pl. 20, figs. 1, 2

<sup>58</sup> Oldroyd (1927, p. 186) stated "Type in United States National Museum, no. 122567." The U. S. National Museum Catalogue reads for no. 122567: "Puget Sd. Coast of Washington, Sta. 2882, 68 fms. sd. 458 U. S. F. Com. Sta. Albatross July 25. 1891, 1 specimen, figured specimen." A specimen collected in 1891 could not be an original type of a Carpenter species, for Carpenter died in 1877. No. 122567 is probably the specimen figured by Dall (1902).

<sup>59</sup> Catalogue Books, Manuscripts, Maps, and Drawings in the British Museum, vol. III, L-O, 1910, p. 1096; dates by livr.

Subgenus *Chlorostoma* Swainson, 1840

*Chlorostoma* SWAINSON, 1840, Treat. Malacol, p. 350

Type species by subsequent designation, HERRMANNSEN, 1846, Indices Gen. Malacozoorum, vol. I, p. 231, *Trochus aryostomus* GMELIN, 1791, Syst. Nat., 13 ed., pt. VI, p. 3583. Recent. Philippines and China seas. PILSBRY, 1889, Man. Conch., vol. XI, pl. 25, figs. 11, 12.

*Tegula (Chlorostoma) funebris subaperta* (Carpenter)

(Pl. 19, figs. 1, 2)

*Chlorostoma funebre subapertum* CARPENTER, 1864b, p. 627, 652; Reprint, 1872, p. 113, 138; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 25; DALL in WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 200, pl. 21, fig. 6 type; ARNOLD, 1903, p. 325

*Tegula (Chlorostoma) funebre subapertum* (Carpenter), DALL, 1921, p. 174  
*Tegula (Chlorostoma) funebris subaperta* (Carpenter), OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 171; 1927, vol. II, pt. III, p. 174; BAILEY, 1935, West Coast Shells (KEEP), p. 154; GRANT AND GALE, 1931, p. 827; KEEN, 1937, p. 46; BURCH, 1946, no. 57, p. 35

*Tegula funebris* A. ADAMS, SMITH AND GORDON, 1948, California Acad. Sci., ser. 4, vol. XXVI, no. 8, p. 201 *subaperta* included under

“. . . funebre . . . with umbilical pits.” [Carpenter, 1864b, p. 652]

The holotype is a shell with an operculum. The label is “Neah Bay J. G. Swan type.”

The shell is blackish, partly smooth, smoothest over the spire and lower body whorl; strong sutural rib present just below the suture; spiral ribs on the upper body whorl; apex worn, blunt, base with spiral ribs; posterior groove on the labrum, large tooth on the labium; umbilicate; operculum horny, circular, spiraling, and thin.

Dall (1892) figured the basal area of the holotype.

Some authors have expressed doubt as to the value of this subspecies. Burch stated that certain colonies seem to be umbilicated and others not.

*Holotype*.—U. S. National Museum, no. 123496

*Distribution*.—Recent. Neah Bay, Washington (type); Neah Bay, Washington, to San Diego, California (Baker in Grant and Gale, 1931). Pleistocene (Arnold)

Genus *Halistylus* Dall, 1889

*Halistylus* DALL, 1889, U. S. Nat. Mus., Proc., vol. 12, p. 341

Type species by original designation, *H. columna* DALL, 1889, U. S. Nat. Mus., Proc., vol. 12, p. 341, pl. IX, fig. 7. Recent. Rio de Janeiro, 59 fathoms; off Rio de la Plata, 10–12 fathoms

The type species of this genus is smooth. The West Coast species differs from the typical by the presence of fine spiral sculpture.

*Halistylus pupoideus* (Carpenter)

(Pl. 19, fig. 4)

*Fenella pupoidea* CARPENTER, 1864b, p. 613, 656; Reprint, 1872, p. 99, 142; 1866, California Acad. Sci., vol. III, p. 217; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30

*Fenella subpupoidea* TRYON, 1887, Man. Conch., vol. IX, p. 394, pl. 60, fig. 77 new name for *F. pupoidea* not *Finella pupoides* A. ADAMS, 1860, Ann. Mag. Nat. Hist., ser. 3, vol. VI, p. 336

*Halistylus subpupoideus* (TRYON), DALL, 1921, p. 174; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 171; 1927, vol. II, pt. III, p. 173; KEEN, 1937, p. 36

*Cantharidus (Halistylus) pupoideus* DALL, WILLIAMSON, 1892, U. S. National Museum, vol. 15, no. 898, p. 202, pl. XIX, fig. 2

*Halistylus pupoideus* (Carpenter), GRANT AND GALE, 1931, p. 825; KEEN in BURCH, 1946, no. 57, p. 34; WOODRING, BRAMLETTE, AND KEW, 1946, p. 61; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 201

*Halistylus subpupoideus* [sic] (Carpenter), BURCH, 1946, no. 57, p. 32

“Variegated, truncatelloid shape. 20 fm. rare *Cp.*” [Carpenter, 1864b, p. 656] Listed from Monterey, California.

“. . . State Collection, no. 389

“*F. t. Truncatellaeformi*, sed apice haud decollato; colore maxime variante; seu unicolori, albido, cinereo, viridescente, rufosusco, seu splendide rubro; seu varie fusco maculato; anfr.

nucl. iii. laevibus, globosis, vertice mamillato; norm. v. rotundatis, fere aequalibus, plus minusve solutis, suturis subimpressis; tota superficie tenue spiralter striata; striis in spira majoribus, circ. viii. distantibus, minoribus creberrimis intercalantibus; circa basim rotundatam circ. x majoribus, contiguis, minoribus paucis; apertura circulari, peritremati continuo, solido, ad suturam parum callosam appresso; umbilico nullo.

"Long. 0.23, long. spir. 0.16, lat. 0.09, div. 12°.

"Hab. Monterey, 20 fm. 45, dead. *Cooper*." [Carpenter, 1866 a, p. 217]

There are two syntypes of this species in the U. S. National Museum, labeled from the "Bay of Monterey Cooper type." The types are not in the Academy of Natural Sciences at Philadelphia, as reported by Oldroyd and followed by Grant and Gale.

The whole surface of the shell is covered with fine spiral ribs with equal interspaces. Between some of the spiral ribs there are microscopic spiral striae; no umbilicus; round entire aperture with the margin thick and flaring below the umbilical area. Both specimens measure 5.5 mm. height and 2 + mm. greatest diameter.

Although this species was briefly described in 1864, Carpenter gave full notes in 1866. The type locality is definitely stated, and the types are available. Carpenter's name does not seem to be a homonym of *F. fupoides* Adams, 1860, so it may be retained.

*Syntypes*.—U. S. National Museum, no. 14824

*Distribution*.—Recent. Monterey, California (type); Forrester Island, Alaska, to Panama (Burch). Pleistocene (Grant and Gale; Woodring, Bramlette, and Kew)

#### Genus *Norrisia* Bayle, 1880

*Norrisia* BAYLE, 1880, Jour. de Conchyl., vol. 28, p. 241 new name for *Trochiscus* SOWERBY, 1838 not of HEYDEN, 1826 nor of HELD, 1837 nor of JAKOVLEV, 1879, for references see NEAVE 1939-1940

Type species by monotypy and original designation of *Norrisia*, *Trochiscus norrisii* SOWERBY, 1838, Mag. Nat. Hist., vol. 2, n.s. p. 97. Living. Monterey, California, to Cedros Island, Lower California. Pleistocene. California and Mexico. BAILY, 1935, West Coast Shells (Keep), p. 156, fig. 122; ABBOTT, 1954, pl. 18, fig. M

#### *Norrisia norrisii* (Sowerby)

##### *Trochiscus convexus* Carpenter

*Trochiscus convexus* CARPENTER, 1864b, p. 537, 652; Reprint, 1872, p. 23, 138; 1865, Ann. Mag. Nat. Hist., vol. XV, p. 180; Reprint, 1872, p. 282; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 25; GABB, 1869, Paleontology California, vol. II, p. 85 juvenile *Trochiscus norrisii* Sowerby; COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 62; PILSBRY, 1889, Man. Conch., vol. XI, p. 276 under *Norrisia norrisi*; ARNOLD, 1903, p. 331 following Gabb; GRANT AND GALE, 1931, p. 824

The synonymy is not intended to be for that of *Norrisia norrisii* (Sowerby). (See Grant and Gale, 1931, p. 824)

"Small, subturritid, whorls [*sic*] swollen: umbilicus with 2 ribs, the outer crenated." [Carpenter, 1864b, p. 652, *Trochiscus convexus*]

"T. testa parva, subelevata, purpureo-fusca, tenuiter sculpta; anfr. nucl. ? sinistralibus, vertice quasi decollato; norm. IV., convexis, suturis impressis; obtusissime bicarinatis, striolis confertissimis, minimis, sub-obsoletis cinctis; umbilico majore, costis duabus cincto, quarum interior acuta, exterior rotundata, crenata; apertura circulari. Long. .15, long. spir. .06, lat. .15, div. 90°.

"Hab. Monterey (*Jewett*).

"The nuclear whorls in this unique little shell and in the typical species appear sinistral, as in Phoridae and Solariadae. The operculum also resembles that of *Solarium* rather than of *Trochus*. The genus may prove to belong to the Proboscifidifera, notwithstanding its nacreous texture." [Carpenter, 1865h, p. 180 *Trochiscus convexus*]

*Type*.—Not found

*Distribution*.—Monterey, California (type of *T. convexus* Carpenter). For *Norrisia norrisii*, see Dall (1921, p. 174).

#### "*Trochiscus Jewetti* Carpenter" *nomen nudum*

There is in the Carpenter Collection in the Redpath Museum a specimen (no. 2359) labelled "*Trochiscus Jewetti* Monterey Jewett type." The name is a *nomen nudum*. The speci-

men measures 4 mm. height and 5 mm. greatest diameter, dimensions which are slightly larger than those given for *T. convexus* Carpenter but could qualify for the specimen of that name. It corresponds somewhat to the description of *T. convexus*. Because the name *T. jewetti* was never published by Carpenter an illustration of the type is not included herein.

Family VITRINELLIDAE (Cyclostrematidae)

Genus *Teinostoma* H. and A. Adams, 1853

*Teinostoma* H. AND A. ADAMS, 1853, Genera of Recent Mollusca, vol. I, Aug., p. 122; A. ADAMS, 1853, Zool. Soc. London, Proc., pt. XXI, p. 183 (as new genus); PILSBRY AND MCGINTY, 1945, Nautilus, vol. 59, no. 1, p. 1

Type species by subsequent designation, COSSMANN, 1888, Ann. Soc. roy. malac. Belgique, t. XXIII, ser. 4, t. III, p. 44; monotype A. ADAMS, 1853, Zool. Soc. London, Proc., pt. XXI, p. 183. *Teinostoma* = [*Teinostoma*] *politum* A. Adams. Living. "Sancta Elena, 8 fathoms" (A. Adams). H. AND A. ADAMS, 1853, Genera of Recent Mollusca, vol. I, pl. 12, fig. 9; TRYON, 1888, Man. Conch., vol. X, pl. 34, figs. 46, 47

Subgenus *Pseudorotella* Fischer, 1857

*Pseudorotella* P. FISCHER, 1857, Jour. de Conchyl., t. 6, p. 52

Type species by monotypy, *Rotella semi-striata* D'ORBIGNY in SAGRA, 1845, Hist. fis. polit. nat. Isla de Cuba, Moluscos, t. V, p. 185; 1855, t. VIII, pl. XVIII, figs. 20-22. Recent. West Indies.

*Teinostoma* (*Pseudorotella*) *invallatum* (Carpenter)

(Pl. 19, figs. 8, 9)

*Ethalia supravallata* ? var. *invalata* CARPENTER, 1864b, p. 612, 652, Reprint, 1872, p. 98, 138; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 215; PILSBRY, 1889, Man. Conch., vol. XI, p. 462

*Ethalia invalata* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 25

*Teinostoma invalata* (Carpenter), DALL, 1921, p. 182; OLDROYD, 1927, vol. II, pt. III, p. 227; KEEN, 1937, p. 46; BURCH, 1946, no. 58, p. 22 *invalatum*; SMITH AND GORDON, 1948, California Acad. Sci., Proc., vol. XXVI, no. 8, p. 203

*Pseudorotella invalata* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, p. 63

"... Without keel." [Carpenter, 1864b, p. 652]

The following lines should be added to Oldroyd's (1927) copy of the Carpenter's description (1866a) to make that copy complete:

"*Hab.* San Diego, Shell-washings, *Cooper*."

"These shells would certainly have been regarded as distinct, but for one specimen which began smoothly, yet after a fracture suddenly commenced a (not prominent) keel: an instructive lesson on variation in sculpture." [Carpenter, 1866a, p. 215]

The holotype is still glued to the original Carpenter glass mount with the original label, "type S. Diego." The printed label has "Cooper" in addition.

The specimen is well preserved. It has microscopic radiating striations over the body whorl.

*Holotype*.—U. S. National Museum no. 15574b

*Distribution*.—Recent. San Diego, California (type); Monterey, California, to Gulf of California (Dall). Pleistocene (Woodring, Bramlette, and Kew)

*Teinostoma* (*Pseudorotella*) *supravallatum* (Carpenter)

(Pl. 19, figs. 6, 7)

*Ethalia supravallata* Carpenter, 1864b, p. 612, 652; Reprint, 1872, p. 98, 138; 1866, California Acad. Sci., Proc., vol. III, p. 215; Cooper, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 25; Pilsbry, 1889, Man. Conch., vol. XI, p. 462

*Teinostoma supravallata* (Carpenter), DALL, 1921, p. 182; KEEN, 1937, p. 46; BURCH, 1946, no. 58, p. 21, *supravallatum*

*Pseudorotella supravallata* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, p. 63

"Minute: with keel and furrow near suture." [Carpenter, 1864b, p. 652]

"E. t. parva, albida, nitente, subdiaphana, planata; anfr. nucl. ii et dimidio, laevis, diaphanis, norm. uno et dimidio, rotundatis; postice carina valde extante, et fossa concava contigua

suturam tenuis, supra spiram vix planatam ascendente, in medio basis rotundatae carina altera plus minusve extante; inter eas, circa peripheriam, lirulis radiantibus minimis haud expressis, sub lente vix conspicuis; regione umbilicari parum concavo; apertura circulari; labro à carinis angulato; columella, valde callosa, porrecta; callositate pyriformi regionem umbilicarem circumambiente.

"Long. 0.03, long. spir. 0. (?) lat. 0.45, div. 180°.

"Hab. San Diego, Cooper, shell-washings.

"Typical among the Vitrinelloid *Ethaliae* described in Maz. Cat. nos. 310, 318. Remarkable for the small number of turns in the mature shell as compared with the nucleus." [Carpenter, 1866a, p. 215]

Apparently by an oversight this species was omitted from the text of Oldroyd's monograph. It is listed (Oldroyd, 1947, vol. II, pt. III, p. 7), and *T. invallatum* is included. Since *T. invallatum* was originally described as the "variety," *T. supravallatum* would have priority in the preservation of names if the two forms were united.

The holotype is glued on a Carpenter original glass mount with a Carpenter label marked "type" and "San Diego." The printed label bears "Cooper" in addition. The specimen is well preserved. The photographs of the holotypes reveal the differences in the columellar callus of *T. supravallatum* and *T. invallatum*, the strongly carinated base of *T. supravallatum*, and the microscopic striations on the body whorl of *T. invallatum*.

*Holotype*.—U. S. National Museum, no. 15574

*Distribution*.—Recent. San Diego, California (type); Monterey, California, to the Gulf of California (Dall). Pleistocene (Woodring, Bramlette, and Kew)

#### Family LIOTIIDAE

#### Genus *Liotia* Gray, 1847

*Liotia* GRAY, Zool. Soc. London, Proc., 1847, p. 145

Type species by monotypy, *Delphinula cancellata* GRAY, 1828, Spicilegia Zoologica, pt. 1, p. 3, pl. 6, fig. 8. Recent. Arica to Coquimbo, Chile. TRYON, 1888, Man. Conch., vol. X, pl. 36, fig. 2; PILSBRY, 1933, Acad. Nat. Sci. Philadelphia, Proc., vol. 85, pl. 13, figs. 7, 7a, 7b; text fig. 3

#### *Liotia fenestrata* Carpenter

(Pl. 19, figs. 10, 11)

*Liotia fenestrata* CARPENTER, 1864b, Aug., p. 612, 652; Reprint, 1872, p. 98, 138; 1864, Dec., California Acad. Sci., vol. III, p. 158 date published bottom p. 161, Dec. 1864; COOPER, 1867, Geog. Cat. Moll. Geol. Sur. California, p. 25; TRYON, 1888, Man. Conch., vol. X, p. 109, pl. 36, fig. 97 copy "Thes. Conch., t. 478, f. 23"; [vol. V, 1884, p. 157] t. 478, f. 23"; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 199; DALL, 1921, p. 173; OLDROYD, 1927, vol. II, pt. III, p. 170; PILSBRY, 1934, Acad. Nat. Sci. Philadelphia, Proc., vol. LXXXV, p. 375; STRONG, 1934, San Diego Soc. Nat. Hist., Trans., vol. VII, no. 37, p. 435, pl. 28, figs. 10–12, *L. cookeana* DALL, pl. 30, figs. 7–9; KEEN, 1937, p. 37; BURCH, 1946, no. 57, p. 26; SMITH AND GORDON, 1948, California Acad. Sci., ser. 4, Proc., vol. XXVI, p. 201; ABBOTT, 1954, p. 122, pl. 18, fig. u

*Liotia cookeana* DALL, 1918, Biol. Soc. Washington, Proc., vol. 31, p. 8; OLDROYD, 1927, vol. II, pt. III, p. 171, pl. 91, figs. 12, 13, 13a not 15 as stated; STRONG AND HANNA, 1930, California Acad. Sci., Proc., ser. 4, vol. 19, p. 5; young of *L. fenestrata* *vide* STRONG, 1934; KEEN, 1937, p. 37.

"Small. Strongly ribbed each way. Bch.—40 fm. d.Cp." [Carpenter, 1864b, Aug., p. 652]

The following lines should be added to Oldroyd's copy (1927) of Carpenter's description (1864e, p. 158):

"... State Collection, Species 1006.

"Hab. Catalina Island; beach to 40 fms. 20, dead.

"This strongly sculptured species varies greatly (in the two specimens sent to the Smithsonian Institution), in the declivity of the mouth and consequent size of the umbilicus, where the labium is, as it were, scooped out." [Carpenter, 1864b, Dec., p. 158]

Strong discussed and illustrated this species well. *L. fenestrata* is similar in shell character to the type species of the genus, *L. cancellata* (Gray) (Pilsbry, 1934, pl. 13, figs. 7, 7a, 7b).

The lectotype is a specimen in the U. S. National Museum. The label states, "Type fig'd." The writer has not found the reference where the type was figured. Probably it was an intention which was never fulfilled.

The lectotype (the second specimen mentioned by Carpenter has apparently been lost) has six large spiral ribs on the body whorl. The apical whorls are flat. The spiral ribs are crossed by equally large longitudinal ribs. The crossing of the two sets of ribs forms a large rectangular sculptural pattern. The umbilicus is large, deep, and the margin has a coarse rib. The shell was a dead specimen. Its occupant, a hermit crab, is still intact.

*Lectotype*.—U. S. National Museum, no. 16283

*Distribution*.—Recent. Catalina Island, California (type); Monterey, California, to San Martin, Lower California (Burch). Pleistocene (Woodring, Bramlette, and Kew, 1946, p. 63)

#### Genus *Arene* H. and A. Adams, 1854

*Arene* H. and A. Adams, 1854, *Genera Recent Mollusca*, vol. I, p. 404

Type species by subsequent designation, WOODRING, 1928, Carnegie Inst. Washington, Pub. 385, p. 422, *Turbo cruentatus* MERGERLE VON MÜHLFELD, 1824, Ges. Nat. Fr. Berlin, verh. 1, pt. 4, p. 211, pl. VII [1], figs. 8a, 8b. Recent. West Indies. PILSBRY, 1888, *Man. Conch.*, vol. X, pl. 36, fig. 9; *Delphinula radiata* KIENER, 1838-1839,<sup>60</sup> *Spec. gen. Icon. coq.*, vol. X, *Delphinula*, pl. 4, fig. 9

#### *Arene acuticostata* Carpenter

(Pl. 19, figs. 12, 13)

*Liota acuticostata* CARPENTER, 1864b Aug., p. 612, 652; Reprint, 1872, p. 98, 138; 1864, Dec., [date on bottom of p. 161], *California Acad. Sci., Proc.*, vol. III, p. 159; COOPER, 1867, *Geog. Cat. Moll.*, *Geol. Sur. California*, p. 25; TRYON, 1888, *Man. Conch.*, vol. X, p. 109, pl. 36, fig. 1; WILLIAMSON, 1892, *U. S. Nat. Mus., Proc.*, vol. 15, no. 898, p. 199; STRONG AND HANNA, 1930, *California Acad. Sci., Proc.*, ser. 4, vol. 19, p. 5, 19; DALL, 1921, p. 173; OLDROYD, 1927, vol. II, Pt. III, p. 170; STRONG, 1934, *San Diego Soc. Nat. Hist.*, vol. VII, no. 37, p. 437, pl. 29, figs. 7, 8, 9, figs. 13, 14, 15 var. *bristolae* Baker; KEEN, 1937, p. 37

*Arene acuticostata* (Carpenter), BURCH, 1946, no. 57, p. 26; SMITH AND GORDON, 1948, *California Acad. Sci., Proc.*, ser. 4, vol. XXVI, p. 201

"Small. Sharply keeled, without radiating sculpture. 10-20 fm. *Cp.*" [Carpenter, 1864b, p. 652]

The following lines should be added to Oldroyd's copy (1927) of Carpenter's description (1864, p. 159):

"Long. 0.12, long. spir. 0.06, lat. 0.10, div. 95°.

"*Hab.* Catalina Island, 10-20 fms. 4, alive; Monterey, 4 dead, dredged?

"This pretty little Cyclostomoid species is easily recognized by the sharp revolving keels, and the absence of radiating sculpture." [Carpenter, 1864b, p. 159]

On the lectotype there are seven large spiral ribs on the body whorl including the base where the last spiral rib continues into the umbilicus. Microscopic longitudinal striae cross the spiral ribs on the spire. The illustrations in Strong of *A. acuticostata bristolae* are more like those of the type of *A. acuticostata* than are the illustrations which Strong gave for typical *A. acuticostata*.

The absence of radiating sculpture, which Carpenter noted, and the character upon which Dall founded the subspecies *radiata* Dall (1918a, p. 8; Baker, 1927, p. 72; Strong, 1934, p. 438, pl. 29, figs. 13-15) (= *bristolae* Baker) are probably not so important as those authors believed. The radiating lines are fine and are seen on the type under the binoculars. Their absence in some cases may be due to decortication.

The lectotype of *A. acuticostata* in the U. S. National Museum has a label, "type fig'd." The writer has not found an illustration of the specimen previous to the ones herein. The figure Tryon (1888, pl. 36, fig. 1) might be the shell, but the writer doubts that identity. The explanation of the figure by Tryon (1888, pl. 36, fig. 1) described the individual as "specimen," and the execution of the drawing of the sculpture of the shell is not true enough for identification.

Since there were originally several syntypes (4:4) it seems more appropriate to refer to the remaining specimen as a lectotype than a holotype.

*Lectotype*.—U. S. National Museum, no. 16282

<sup>60</sup> Sherborn and Woodward (1901, p. 219)



*Distribution*.—Recent. Catalina Island, California (type); Monterey, California, to Tres Marias Islands, Mexico (Burch). Pleistocene (Woodring, Bramlette, and Kew, 1946, p. 63)

## Family TURBINIDAE

Genus *Homalopoma* Carpenter, 1864, Aug.

*Homalopoma* CARPENTER, 1864b, Aug., p. 537, 588, 627, 652; Reprint, 1872, p. 23, 74, 113, 138.

New name for *Leptonyx* CARPENTER, 1864

*Leptonyx* CARPENTER, 1864b, Aug., p. 612, 627, 652; Reprint, 1872, p. 98, 113, 138; 1864, Dec., California Acad. Sci., Proc., vol. III, p. 176 Adams partially included in authorship. Not *Leptonyx* SWAINSON, 1833; GRAY, 1837, or LESSON, 1842 see NEAVE, (1939-1940)

*Leptothyra* DALL, 1871, Amer. Jour. Conch., vol. VII, p. 130 Carpenter ms. Not *Leptothyra* PEASE, 1869, Amer. Jour. Conch., vol. 5, p. 70

*Petropoma* GABB, 1877, Acad. Nat. Sci. Philadelphia, Jour., new species, vol. VIII, p. 281 *vide* PILSBRY, 1893, Nautilus, vol. 7, p. 84

*Collonista* IREDALE, 1918, Malacol. Soc. London, Proc., vol. 13, p. 28, 30 *vide* WENZ, 1938, Hand. Palaeozoologie, Bd. 6, Teil 2, p. 341

Type species by monotypy, *H. sanguineus* (Linnaeus) = *Turbo sanguineus* LINNAEUS, 1758, Syst. Naturae, p. 763. Living. Mediterranean and Adriatic Sea. PILSBRY, 1888, Man. Conch., vol. X, p. 249, pl. 49, figs. 48, 49; pl. 64, figs. 60, 61

Although the monotype which Carpenter used when originating this generic name was a misidentification his citation of Linnaeus' name confirms the Linnaean species as the type species. Even though Carpenter probably had the West Coast form in mind there is not conflict enough in regard to the generic name to warrant submission of the problem to the International Commission on Zoological nomenclature.

*Homalopoma baculum* (Carpenter)

(Pl. 19, figs. 14, 15)

*Leptonyx bacula* CARPENTER, 1864b, Aug., p. 612, 652; Reprint, 1872, p. 98, 138 *Homalopoma*, p. 652; 1865, California Acad. Sci., Proc., vol. III, p. 177; PILSBRY, 1888, Man. Conch., vol. X, p. 248, pl. 39a, fig. 33; DALL, 1921, p. 173; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 170; 1927, vol. II, pt. III, p. 167

*Leptothyra bacula* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 25; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 199

*Homalopoma bacula* Carpenter, GRANT AND GALE, 1931, p. 822 see for additional synonymy; KEEN, 1937, p. 37; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 64

*Homalopoma baculum* (Carpenter), BURCH, 1946, no. 57, p. 23; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 200

*Turbo paucicostatus* "Dall, 1887" SOWERBY, 1884, Thes. Conch., vol. 5, p. 229, pl. 13, fig. 172 not *L. paucicostata* DALL, 1871, *Fide* PILSBRY, 1888, and GRANT AND GALE, 1931

"Small, ashy, Helicina-shaped, nearly smooth. Bch. d. *Cp.* Genus *Homalopoma*, p. 537: nom. prec." [Carpenter, 1864b, p. 652]

The following lines should be added to Oldroyd's copy (1927) of Carpenter's description (1865):

"*Hab.* Catalina Is., dead on beach; *Cooper*, no. 1056.

"This unpretending little shell resembles on the back one of the small Helicinae. It differs from *L. sanguineus* in its small size, ashy color, flattened sutures, and nearly obsolete sculpture. A groove in the somewhat callous columella, continued slightly round the labrum, seems intended for the broad-margined operculum of the genus." [Carpenter, 1864e, p. 177]

The holotype, in the U. S. National Museum, is labelled "type Catalina Is. Cooper." There are the remains of a hermit crab within the shell. The shell is smooth with faint suggestions of spiral lines on the penultimate whorl.

*Holotype*.—U. S. National Museum, no. 16284

*Distribution*.—Recent. Catalina Island, California (type); Puget Sound to San Martin Island, Lower California (Dall). Pleistocene (Arnold, 1903; Grant and Gale; Woodring, Bramlette, and Kew). Pliocene (Arnold, 1903; Berry 1908)

*Homalopoma carpenteri* (Pilsbry)

*Leptonyx sanguinea* ("Linnaeus") CARPENTER, 1864b, p. 612, 627, 652; Reprint, 1872, p. 98, 113, 138; 1864, Dec., California Acad. Sci., Proc., vol. III, p. 176. Not *Turbo sanguineus* LINNAEUS, 1758, Syst. Natural, 10th ed., p. 763

- Leptonyx sanguincus*, var. *purpureum* CARPENTER, 1864, Dec., California Acad. Sci., Proc., vol. III, p. 176  
*Homalopoma sanguincum* CARPENTER, 1864b, p. 537, 588, 627, 652; Reprint, 1872, p. 23, 74, 113, 138  
*Leptothyra sanguinea* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 25; GABB, 1869, Pal. California, vol. II, p. 85; DALL, 1871, Amer. Jour. Conch., vol. VII, p. 130  
*Leptothyra carpenteri* PILSBRY, 1888, Man. Conch., vol. X, p. 247, pl. 39a, figs. 26–29; pl. 60; fig. 66 new name for *L. sanguineus* Carpenter not LINNAEUS; PILSBRY, 1890, Nautilus, vol. 4, no. 3, p. 36; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 199; ARNOLD, 1903, p. 323; DALL, 1921, p. 172; OLDROYD, 1927, vol. II, pt. III, p. 167; BAILY, West Coast Shells, KEEP, 1935, p. 166, fig. 139  
*Leptonyx sanguineus* [sic] "Linn.," KEEP, 1887, West Coast Shells, p. 87, fig. 73  
*Homalopoma carpenteri* (Pilsbry), GRANT AND GALE, 1931, p. 821; KEEN, 1947, p. 37; BURCH, 1946, no. 57, p. 22; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 63 Pleistocene; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 200

Pilsbry renamed the Pacific Coast shells which Carpenter had identified as the Linnaean species from the Mediterranean. The original description dates from Pilsbry. Unfortunately Pilsbry did not specify the locality of the specimens figured; the type has not been separated. The type is not at the Academy of Natural Sciences at Philadelphia, as stated by Oldroyd and followed by Grant and Gale. The specimens from which a lectotype could properly be chosen is the material in the U. S. National Museum identified by Carpenter and studied by Pilsbry. There are many lots including hundreds of shells in the U. S. National Museum collections made by individuals since Carpenter's and Pilsbry's time. Those lots would not qualify for lectotype material. There are five specimens, U. S. National Museum no. 15536, possibly a type lot, labelled "Neeah Bay, W. T. J. G. Swan." The specimens are large and of the measurements provided by Pilsbry (8 mm.  $\times$  8.9 mm.). No. 14813b is a dark form, measuring 5 mm.  $\times$  5 mm., which could be the specimen mentioned by Pilsbry. There is also one specimen, U. S. National Museum, no. 6186, labelled "Monterey, Cooper, Taylor." These specimens definitely meet the required labels of Carpenter's description.<sup>61</sup>

By choosing a lectotype from lot no. 15536, the problem of the type locality would also be settled. Until a lectotype is chosen there is no basis for the statement that the type locality is "California." Carpenter's material came from Monterey, California, and Neah Bay, Washington. Pilsbry's remarks stipulated only the range of the species from "Cape St. Lucas, L. California to Vancouver Id.," without selecting a type locality.

Technically this is not a Carpenter specific name, and the writer prefers not to select a lectotype at this time but leave the matter open to one who may study the species.

*Type*.—Lectotype to be selected

*Distribution*.—Recent. Sitka Sound, Alaska, to San Martin Island, Lower California (Burch). Pleistocene (Arnold); Chace and Chace; Grant and Gale; Woodring, Bramlette, and Kew; Mexico (Jordan). Pliocene (Berry)

Genus *Turbo* Linneaus, 1758

Subgenus *Callopoma* Gray, 1850

*Turbo (Callopoma) fluctuosus* Wood

*Callopoma (Turbo) ? fluctuatum* var. *depressum* Carpenter

(Pl. 16, fig. 6)

*Turbo fluctuosus* WOOD, 1828, Index Test. suppl., pl. 6, fig. 44

*Callopoma (Turbo) ? fluctuatum* var. *depressum* CARPENTER, 1855, Zool. Soc. London, Proc., pt. XXIII, p. 234; PILSBRY, 1888, Man. Conch., vol. X, p. 211 as *Turbo (Callopoma) fluctuosus depressus*

"C. t. valde depressa, anfractibus V., quarum ultimus tumidus, sutura impressa; liris spiralis circiter XXX., quarum plerumque V. majores sunt, subrugosis; viridi, punctis albis

<sup>61</sup> "Hab. . . . Monterey, Jewett, Taylor, Cooper. Neeah Bay, W. T., Swann." [Carpenter, 1864e, Dec., p. 176]

transversim in liris subirregulariter dispositis; apertura ad basin posteriusque producta; columella paulum excavata, non umbilicata.

"Long. 2.02, lat. 2.04, lon. spir. .78, poll.; div. 110°.

"Hab. California. Mus Cuming.

"Syn. *Turbo fluctuatus*, var., Rve. Conch. Ic. pl. VIII. f. 34.

"Among many hundred specimens examined of the true *C. fluctuatum* from the Mazatlan Collection, there was not one approaching this shell. Nevertheless, as there is in the British Museum a somewhat intermediate form, it may possibly be a variety of that species. The operculum is unfortunately wanting in Mr. C.'s specimens: until that has been examined, the point must remain in abeyance." [Carpenter, 1855, p. 234]

This form has not been noted in the California fauna since Carpenter described it except by Pilsbry (1888) who suggested that possibly the reference in Reeve (1848) should have been Figure 3c, of Plate IX.

The specimen figured is of the Carpenter type furnished by the British Museum (Natural History). G. L. Wilkins sent to the writer the following notes which are the label with the shell: "*Callopona? fluctuatum* var. *depressum*. P.Z.S. Calif. Type. Mus. Cuming." It is a Nuttall label.

#### Genus *Astraea* Roeding in Bolten, 1798

*Astraea* ROEDING in BOLTEN, 1798, Mus. Boltenianum, pt. 2, p. 79

Type species by subsequent designation, SUTUR, 1913, Man. New Zealand Moll., p. 166;

*Trochus imperialis* GMELIN, 1791, Syst. Nat., 13 ed., p. 3576; = *Trochus heliotropium* MARTYN, 1784, Univ. Conch., 1, p. 30. Recent. New Zealand. SUTUR, 1913, Man. New Zealand Moll., pl. 41, fig. 1; POWELL, 1946, The Shellfish of New Zealand, 2d ed., pl. 13, fig. 7

#### Subgenus *Pomaulax* Gray in M. E. Gray, 1850

*Pomaulax* GRAY, J. E., in GRAY, M. E., [dated 1859], issued 1850, Figures of Molluscan Animals, vol. IV, p. 87

Type species by subsequent designation, HERRMANNSEN, 1852, Indicies Gen. Malacozorum, Suppl., p. 111, *Trochus japonicus* Dunker, PHILIPPI, 1845, (1844) Abbild. Beschrieb., I, 8, p. 187, pl. 5, fig. 1. Recent. Japan. PILSBRY, 1888, Man. Conch., vol. X, pl. 58, figs. 63, 64; HIRASE, 1936, Japanese Shells, pl. 74, fig. 11

The first type designation was Herrmannsen. His statement supersedes that of Cossmann, 1918,<sup>62</sup> who used the same species, *T. japonicus* Dunker.

*P. undosus* [Wood] and *P. japonicus* [Dunker] are the two species included in the original description.

#### *Astraea (Pomaulax) undosa* (Wood) young

(Pl. 19, figs. 16, 17)

(? *Imperator serratus* Carpenter)

*Trochus undosus* WOOD, 1828, Index Test., Suppl., p. 16, pl. 5, fig. 1a PILSBRY, 1888, Man. Conch., vol. X, p. 243, 289

? *Imperator serratus* CARPENTER, 1864b, p. 612, 652; Reprint, 1872, p. 98, 138

"? *Imperator serratus*. ?? n.s. Monterey; Cat. Is., 10-20 fm. [Dr. Cooper thinks this shell probably the young of *Pomaulax*.]" [Carpenter, 1864b, p. 612]

". . . Small, finely sculptured, base stellate, nucleus Planorboid; operc. flat, with more whorls. 10-20 fm. = 266 or 267 jun. teste Cp." [Carpenter, 1864b, p. 652]

The holotype of the Carpenter name is in the U. S. National Museum, no. 11832. It has the label, "Catalina Cooper." There is a note in Dall's handwriting = "*Turbo fluctuosus* junior" with the specimen. The specimen is not the same nor is it related to that form of the reference in Dall (1909, p. 238) to "Wood, Index Test., Suppl., 1828, pl. 6, fig. 44." Carpenter, as well as Cooper, thought that the specimen might be the young of "*Pomaulax undosus* Wood" or *Pachypoma gibberosum* Chem. nos. 266 or 267 of Carpenter (1864b, p. 652). This interpretation seems to be correct. The identity may be verified by comparing

<sup>62</sup> Used by Woodring (1938, p. 22, footnote).

the illustrations herein (pl. 19, figs. 16, 17) with that of Pilsbry (pl. 58, fig. 70) of a young specimen of *P. undosus* (Wood).

*Holotype*.—U. S. National Museum, no. 11832 (*Imperator serratus* Carpenter)

*Distribution*.—Catalina Island, California (type, *I. serratus* Carpenter); Mugu Lagoon, California, to Cerros Island, Lower California (Burch)

#### Family PHASIANELLIDAE

#### Genus *Phasianella* Lamarck, 1804

*Phasianella* LAMARCK, 1804, Am. Mus. Hist. Nat., vol. 4, p. 295

Type species by original designation, *faisan*<sup>63</sup>—*Buccinum australe* GMELIN, 1791, Syst. Nat., 13th ed., p. 3490. See BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1884, Moll. Marins du Roussillon, p. 336. Recent. Australia. PILSBRY, 1888, Man. Conch., X, pl. 37, figs. 22–28; pl. 38, fig. 46 *Phasianella bulimoides* Lamarck, 1822 = *Buccinum australe* Gmelin, 1791 see above. See subsequent type designation, Roissy (1805 (1806), p. 330) *P. variegata* (*Buccinum australis* Gmelin) (Woodring, 1957)

#### Subgenus *Eulithidium* Pilsbry, 1898

*Eulithidium* PILSBRY, 1898, Man. Conch., vol. XVII, index, p. 319; 1898, Sept., Nautilus, vol. XII, p. 60. New name for *Eucosmia* CARPENTER, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 475; Reprint, 1872, p. 214. Not *Eucosmia* STEPHENS, 1831; see NEAVE 1839–40

Type species by subsequent designation for *Eucosmia* Carpenter, *E. variegata* CARPENTER, 1864, June, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 475 by PILSBRY, 1888, Man. Conch., vol. X, p. 177 “type, *E. variegata* Carpenter.” = *Phasianella* (*E.*) *typica* DALL, 1908, U. S. Nat. Mus., Proc., vol. XXXIV, no. 1610, p. 255 not *Phasianella variegata* LAMARCK, 1822, Hist. Nat. An. sans vert., VII, p. 53. Recent. Magdalena Bay to Cape San Lucas, Lower California. STRONG, 1928, California Acad. Sci., Proc., ser. 4, vol. XVII, p. 194, 197.

Woodring (1928, p. 420) also designated *E. variegata* Carpenter as the type species of *Eulithidium*. Pilsbry's designation (1888) is explicit and adequate. It is not modified by his conception of the species which included “var.” *substriata* Carpenter.

*Phasianella* (*Eucosmia*) *variegata* Carpenter, 1864, is a homonym of *Phasianella variegata* Lamarck, 1822.

#### *Phasianella* (*Eulithidium*) *rubrilineata* Strong

*Phasianella rubrilineata* CARPENTER, ms., Museum label, California Acad. Sci., no. 3310, Hemphill Coll., “types”

*Phasianella typica* OLDROYD, 1927, vol. II, pt. III, pl. 91, fig. 9 not of Dall

*Phasianella* (*Eulithidium*) *rubrilineata* STRONG, 1928, California Acad. Sci., Proc., ser. 4, vol. XVII, p. 197, pl. 10, figs. 8–10

*Phasianella rubrilineata* Carpenter is a *nomen nudum*. According to Strong (1928) it consists of the label on three specimens from Cape San Lucas in the Hemphill Collection in the California Academy of Sciences. The name was validated by Strong who became its author.

#### *Phasianella* (*Eulithidium*) *substriata* Carpenter

(Pl. 19, figs. 20, 21)

*Phasianella* (*Eucosmia*) (? *variegata*, var.) *substriata* CARPENTER, 1864, June, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 475; Reprint, 1872, p. 215; CARPENTER, 1864b, Aug., p. 618; Reprint, 1872, p. 104

*Phasianella* (*Eucosmia*) *variegata substriata* CARPENTER, 1888, Man. Conch., vol. X, p. 177

<sup>63</sup> “J’ai donné à ce genre le nom de phasianelle d’après celui d’une coquille qui m’a fourni l’occasion de l’établir, et qui est connue sous le nom de faisán (*phasianus*).” [Lamarck, 1804, p. 295]

Lamarck continued with a description of the living shell and ends the observations with mention of two fossil species from Grignon which he described. There is no doubt that Lamarck meant the Recent shell (*P. australis* (Gmelin)) to represent the genus. See also Woodring (1928; 1957).

*Phasianella (Eulithidium) substriata* (Carpenter), DALL, 1921, p. 172; OLDROYD, 1927, vol. II, pt. III, p. 163; STRONG, 1928, California Acad. Sci., Proc., ser. 4, vol. XVII, no. 6, p. 195, pl. 10, fig. 11; KEEN, 1937, p. 44; Burch, 1946, no. 57, p. 19.

*Tricolia substriata* (Carpenter), GRANT AND GALE, 1931, p. 814 section *Eulithidium*.  
Not *Eulithidium substriatum* Carpenter, BERRY, 1907, Nautilus, vol. XXI, no. 4, p. 45 = *P. pulloides* Carpenter *vide* SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 200

Oldroyd included a copy of the original description of this species (1927). Strong discussed this species in detail.

The holotype is on an original Carpenter glass mount with an original label, "type C.S.L."  
*Holotype*.—U. S. National Museum, no. 11829

*Distribution*.—Recent. Cape San Lucas, Lower California (type); Monterey, California, to Panama (Burch). Pleistocene Mexico (Jordan)

#### *Phasianella (Eulithidium) typica* Dall

[*Phasianella*] (*Eucosmia*) *variegata* CARPENTER, 1864, June, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 475; Reprint, 1872, p. 214; 1864b, Aug., p. 618; Reprint, 1872, p. 104; PILSBRY, 1888, Man. Conch., vol. X, p. 177. Not *P. variegata* LAMARCK, 1822, Hist. Nat. An. sans Vert., VII p. 53

*Phasianella (Eulithidium) typica* DALL, 1908, U. S. Nat. Mus., Proc., vol. 34, no. 1610, p. 255 new name for *P. variegata* Carpenter

*Phasianella (Eulithidium) typica* Dall, STRONG, 1928, California Acad. Sci., Proc., ser. 4, vol. XVII, pp. 194, 197

As Strong (1928, p. 197) pointed out, the name *P. typica* was given by Dall to replace the name *P. variegata* Carpenter. Therefore, the type of the species is that of Carpenter's name and not a subsequent specimen. The types of *P. variegata* Carpenter (= *P. typica* Dall) consist of three specimens from Cape San Lucas, U. S. National Museum no. 11836. The specimen figured as type by Oldroyd (1927, pl. 91, fig. 9) does not meet the proper requirements.

*P. typica* Dall does not extend into the upper California area, so that details regarding the species are not included herein.

#### Subgenus *Tricolia* Risso, 1826

*Tricolia* Risso, 1826, Hist. Nat. princ. prod. l'Europe Merid., vol. 4, p. 122

Type species by subsequent designation, GRAY, 1847, Zool. Soc. London, Proc., p. 144; *Turbo pululus* LINNAEUS, 1758, Syst. Natur., p. 761; "Gmelin, 3856"<sup>64</sup> [p. 3589] in Risso, 1826. Recent. Mediterranean. PILSBRY, 1888, Man. Conch., vol. X, pl. 38, figs. 56-58 from REEVE, 1862, Conch. Icon., vol. 13, *Phasianella*, pl. VI, fig. 20 a, b, c

#### "*Phasianella (Tricolia) carpenteri*" Dall

*Eucosmia punctata* CARPENTER, 1864, June, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 475; Reprint, 1872, p. 7; 1864b, Aug., p. 618; Reprint, 1872, p. 104

*Phasianella (Tricolia) compta punctata* (Carpenter), PILSBRY, 1888, Man. Conch., vol. X, p. 173. Not *Tricolia punctata* Risso, 1826, Hist. nat. l'Europe merid., p. 123

*Phasianella (Tricolia) carpenteri* DALL, 1908, U. S. Nat. Mus., Proc., vol. 34, no. 1610, p. 255, new name for *P. punctata* Carpenter not Risso

*Phasianella (Tricola [sic]) pulloides* (Carpenter), STRONG, 1928, California Acad. Sci., Proc. ser. 4, vol. XVII, p. 192 in part

The type of this form has not been discovered. Type locality is Cape San Lucas; hence further discussion will be included in the work on the illustrated Carpenter types of that area.

Strong regarded the form as individual variations of *P. pulloides*, which would extend the range to Puget Sound.

#### *Phasianella (Tricolia) compta punctulata* Carpenter

(Pl. 18, figs. 5, 6)

*Phasianella* (? *compta*, vars.) *punctulata* CARPENTER, 1864b, p. 537, 651; Reprint, 1872, p. 23, 137; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 179; Reprint, 1872, p. 281

<sup>64</sup> Reference to *Serpularia*

*Phasianella (Tricolia) compta punctulata* Carpenter, DALL, 1921, p. 171; OLDROYD, 1927, vol. II, pt. III, p. 162

*Phasianella (Tricolia) pulloides* STRONG, 1928, California Acad. Sci., Proc., ser. 4, vol. XVII, no. 6, p. 192 in part, pl. 10, fig. 5; KEEN, 1937, p. 44; BURCH, 1946, no. 57, p. 17

"[*P. compta*]: var. *punctulata*, with close rows of dots; pillar chinked 8-20 fm. *Cp.*" [Carpenter, 1864b, p. 651]

The following corrections should be made in Oldroyd's (1927) copy of Carpenter's description (1865).

Read ".24" for "24"; ".12" for "12"; ".14" for "14"; delete "poll."

Add:

". . . div. 50°.

"*Hab.* S. Diego (*Jewett*)"—[Carpenter, 1865b, p. 179]

The type material consists of 11 specimens with a label, "Type San Diego Jewett." The specimens are spotted or striped; a few stripes are not broken up into spots, some are mottled. There is a slight umbilical area.

The two type specimens of *P. compta* Gould (1855, p. 25; 1856b, p. 333, pl. XI, figs. 25, 26) are in the National Museum. *P. compta* has the fine oblique brownish stripes.

*Syntypes*.—U. S. National Museum, no. 11288

*Distribution*.—San Diego, California (type); San Diego, California, to Cape San Lucas, Lower California (Dall)

#### *Phasianella (Tricolia) pulloides* Carpenter

(Pl. 19, fig. 30)

*Phasianella* (? *compta*, var.) *pulloides* CARPENTER, 1864b, p. 537, 651; Reprint, 1872, p. 23, 137; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 180; Reprint, 1872, p. 282; COOPER, 1867, Geog. Cat. Moll. Geol. Sur. California, p. 24, PILSBRY, 1888, Man. Conch., vol. X, p. 173, pl. 39, fig. 70

*Phasianella pulloides* Carpenter, COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 61; PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 310 copy description of *P. compta* Gould in Pilsbry; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 200

*Phasianella (Tricolia) pulloides* Carpenter, DALL., 1921, p. 172 as *pulloidea*; STRONG, 1923, Nautilus, vol. 37, no. 43 *pulloidea*; OLDROYD, 1927, vol. II, pt. III, p. 162; STRONG, 1928, California Acad. Sci., Proc., ser. 4, vol. XVII, no. 6, p. 192 in part, pl. 10, fig. 7 "*Tricola*" [sic]; GRANT AND GALE, 1931, p. 814; KEEN, 1937, p. 44; BURCH, 1945, no. 57, p. 17

*Tricola pulloides* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 64

"[*P. compta*] . . . ? Var. *pulloides*, exactly like Herm shells." [Carpenter, 1864b, p. 651]

The following corrections should be made in Oldroyd's (1927) copy of Carpenter's description (1865):

Read .2 for 2; .1 for 1; .13 for 13; delete "poll."

Add:

". . . div. 55°.

"*Hab.* Sta. Barbara (*Jewett*); Monterey, 20 fathoms (State Coll. no. 353). Smaller var., 8-10 fathoms, Catalina Island (*Cooper*)."—[Carpenter, 1865b, p. 180]

The type material consists of 10 specimens, 9 whole and 1 fragment. They are pink or rosy, mottled or uniform. The whorls of the spire have longitudinal rosy and white stripes. There are large blotches on the body whorl which are finer on the base. There are also rosy stripes on the body whorl. There is a slight narrow umbilical groove.

The following label accompanies the syntypes, "Sta. Barbara Jewett (Monterey Cooper)."

Strong (1928) discussed this species and included the forms *punctulata*, *punctata*, and *elatio*.

*Syntypes*.—U. S. National Museum, no. 14814 (16285-16286)

*Distribution*.—Recent. Santa Barbara, California (type); Monterey, California, to Lower California (Dall). Pleistocene. California (Willett, 1937; Woodring, Bramlette, and Kew); Mexico (Jordan, 1926)

*Phasianella* (*Tricolia*) *pulloides elatior* Carpenter  
(Pl. 19, fig. 31)

*Phasianella* (? *compta*, var.) *elatior* CARPENTER, 1864b, p. 537, 651; Reprint, 1872, p. 3, 23, 137; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 180; Reprint, 1872, p. 282; PILSBRY, 1888, Man. Conch., vol. X, p. 173

*Phasianella* (*Tricolia*) *pulloidca elatior* [*sic* in Dall] Carpenter, DALL, 1921, p. 172; OLDROYD, 1927, vol. II, pt. III, p. 162 *pulloides elatior*

*Phasianella* (*Tricola* [*sic*]) *pulloides* Carpenter, STRONG, 1928, California Acad. Sci., ser. 3, vol. XVII, no. 6, p. 192

*Phasianella pulloides* Carpenter, KEEN, 1937, p. 43

"[*P. compta*] . . . ? var. *elatior*, dwarfed, longer and flatter: . . ." [Carpenter, 1864b, p. 651]

The following corrections should be made in Oldroyd's (1927) copy of Carpenter's description:

Read .19 for 19; read .12 for 12; read .11 for 11; delete "poll."

Add:

". . . div. 40°.

"*Hab.* Sta. Barbara (*Jewett*).

"*P. compta*, with a large proportion of the small shells of the genus, is included under *P. pullus* in Mr. Reeve's monograph. In so difficult a tribe, it is judged better to name the distinct forms, and those from separated localities, until more is known."—[Carpenter, 1865h, p. 180]

The suite of this form, segregated with types in the U. S. National Museum collections, consists of seven specimens. They have a label, "*Phasianella* var. *elatior* Cpr. ex auctor Sta. Barbara Jewett." The shells are slender, rosy, striped or with large spots. The stripes are longitudinal, curved, and or spiral. The stripes on the body whorl are broadly zig-zagged with a fluting along the midline which partly shows in the included photograph of the largest specimen.

*Syntypes*.—U. S. National Museum, no. 16287

*Distribution*.—Santa Barbara, California (Dall)

Family LACUNIDAE

Genus *Lacuna* Turton, 1827

*Lacuna* TURTON, 1827, Zool. Jour., III, p. 190

Type species by subsequent designation, GRAY, 1847, Zool. Soc. London, Proc. pt. XV, p. 151, *Nerita pallidula* DA COSTA, 1778, British Conch., p. 51, pl. IV, figs. 4, 5. Recent. Northern Europe. Subspecies *L. p. neritoidea* GOULD, 1840, Greenland to Connecticut. TRYON, 1887, Man. Conch., vol. IX, pl. 50, figs. 53, 53a; pl. 50, fig. 54 *L. neritoidea*

LACUNA CARINATA Gould

*Lacuna carinata* GOULD, 1849, Boston Soc. Nat. Hist., Proc., vol. III, p. 75; 1862, "Expedition Shells," Otia Conch., p. 52;<sup>65</sup> 1852, U. S. Expl. Exped., Moll., vol. XII, p. 194; ATLAS, 1856, figs. 231, 231a, 231b, not 230 as in GOULD, p. 195; TRYON, 1887, Man. Conch., vol. IX, pl. 50, figs. 71, 72 under *L. divaricatus*; WOODRING in BURCH, 1945, no. 55, p. 13, 37 including *L. porrecta* Carpenter; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 65 includes *L. porrecta*; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196 including *L. porrecta*.

*Modiola striata* GABB, 1861, Acad. Nat. Sci. Philadelphia, Proc., vol. 13, p. 368 *fide* CARPENTER, 1864b, p. 632, 656; Reprint, 1872, p. 118, 142; 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 249; Reprint, 1872, p. 240; *fide* WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 65, Pleistocene. Santa Barbara.

*Lacuna solidula carinata* Gould, STRONG, 1924, Nautilus, vol. 38, no. 1, p. 17 including *L. compacta* Carpenter

*Lacuna divaricata carinata* Gould, GRANT AND GALE, 1931, p. 782 includes *L. compacta* Carpenter

<sup>65</sup> Table of correct dates of Gould's publications in Proc. Boston Soc. Nat. Hist., II and III, see Otia Conch., p. 100. "Exped. Shells" is dated 1846, which causes confusion and is quoted incorrectly by authors. The dates range from 1846 to 1850, depending on the volume and page.

Because of the variability of the *Lacunae* as manifested in a small way by the examples of the Carpenter type material and the complexity of the names involved in the *L. divaricata-solidula*—*carinata*—*porrecta* and variations—*compacta* problem, the writer has analyzed each Carpenter name and data separately. The reasonable suggestion that *L. porrecta* and variations may fall under *L. carinata* Gould led the writer to use the comprehensive heading of *L. carinata* for the group. Because there seemed to be considerable confusion in the Gould dates and references of *L. carinata*, the above list has been included.

*Lacuna porrecta* Carpenter

(Pl. 19, figs. 18, 19)

*Lacuna porrecta* CARPENTER, 1864b, Aug., p. 628, 656; Reprint, 1872, p. 114, 142; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 428; Reprint, 1872, p. 240; TRYON, 1887, Man. Conch., vol. IX, p. 265, pl. 50, fig. 55; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 64; KEEP, 1887, West Coast Shells, p. 66; ARNOLD, 1903, p. 303; JORDAN, 1920, U. S. Nat. Mus., Proc., vol. 58, no. 2325, p. 3; DALL, 1921, p. 154, pl. 14, fig. 2 lectotype; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 149; STRONG, 1924, Nautilus, vol. 38, no. 1, p. 17; OLDROYD, 1927, vol. II, pt. III, p. 64, pt. II, pl. 32, fig. 9 same as DALL, 1921; GRANT AND GALE, 1931, p. 783; KEEN, 1937, p. 37

*Lacuna carinata* GOULD, BURCH, 1945, no. 55, p. 13, 37 *L. porrecta* placed in synonymy on authority of Woodring; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 65; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 196

"Upper whorls flattened, effuse anteriorly; chink large." [Carpenter, 1864b, p. 656]

The dimensions in Oldroyd's (1927) copy of Carpenter's description (1865) should be corrected as follows:

For 52 read .52; for 2 read .2; for 4 read .4; delete "poll."

The following lines should be added to make the description complete.

"... div. 80°.

"Hab. Neeah Bay (Swan).

"The form *L. exaequata* is intermediate between the very different *L. porrecta* and *L. effusa*. The *Lacunae* vary so much (vide Forbes and Hanley *in loco*) that, even with a large multitude of specimens, it is not easy to state what constitutes a species." [Carpenter, 1864d, p. 428]

The type material consists of 10 specimens of different ages. One of the specimens selected to figure herein is intermediate in age and best shows the white bands. The other specimens were more worn. Dall figured a larger specimen. Since he considered or designated the specimen as type in 1921, that specimen will be designated the lectotype.

The label, which is not original, is, "Type Neeah Bay Wash. J. G. Swan." The shells are thin and umbilicate.

The drawing in Dall (1921) seems to exaggerate the carination of the body whorl and umbilical channel more than a photograph does.

One doubts the propriety of maintaining the subspecies as named by Carpenter in a group such as *Lacuna*. They are enumerated separately in this paper so that the type data are readily accessible. Their headings are italicized to differentiate from the rank of recognized species.

*Types*.—Lectotype and syntypes, U. S. National Museum, no. 15549b

*Distribution*.—Recent. Neeah Bay, Washington (type); Commander Islands, Bering Sea, southward and eastward to San Diego, California (Dall). Pleistocene. California (? Arnold; Grant and Gale)

*Lacuna porrecta exaequata* Carpenter

(Pl. 19, figs. 22, 23)

*Lacuna porrecta exaequata* CARPENTER, 1864b, p. 628, 656; Reprint, 1872, p. 114, 142; 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 428; Reprint, 1872, p. 240; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; TRYON, 1887, Man. Conch., vol. IX, p. 266, pl. 50, fig. 57; DALL, 1921, p. 154; Oldroyd, 1924, Pub. Puget Sound Biol. Station, vol. 4,



p. 150; STRONG, 1924, *Nautilus*, vol. 38, no. 1, p. 17; OLDROYD, 1927, vol. II, pt. III, p. 64; KEEN, 1937, p. 37

"... same shape but flattened." [Carpenter, 1864b, p. 656]

"Testa *L. effusae* simili sed anfr. planatis, suturis parum impressis. Long. .5, long. spir. .2, lat. .42, div. 80°." [Carpenter, 1864h, p. 428]

The dimensions as given by Oldroyd (1927) should be corrected to read as above.

The habitat and last paragraph of comparisons in the description (1864h) of the species applies also to this form.

The type material consists of 6 specimens of different ages. The label reads "Neeah Bay Swan." All the specimens are worn. A photograph of the largest with the spire more elevated is included herein.

*Syntypes*.—U. S. National Museum, no. 15532

*Distribution*.—Neah Bay, Washington (type)

*Lacuna porrecta effusa* (Carpenter)

(Pl. 19, figs. 24, 25)

*Lacuna porrecta effusa* CARPENTER, 1864b, p. 628, 656; Reprint, 1872, p. 114, 142; 1864, *Ann. Mag. Nat. Hist.*, ser. 3, vol. XIV, p. 428; Reprint, 1872, p. 240; COOPER, 1867, *Geog. Cat. West Coast Moll.*, Geol. Sur. California, p. 29; TRYON, 1887, *Man. Conch.*, vol. IX, p. 266, pl. 50, fig. 56; DALL, 1921, p. 154; OLDROYD, 1924, *Pub. Puget Sound Biol. Station*, vol. 4, p. 150; STRONG, 1924, *Nautilus*, vol. 38, no. 1, p. 17; OLDROYD, 1927, vol. II, pt. III, p. 64; KEEN, 1937, p. 37.

*Lacuna carinata effusa* Carpenter, BURCH, 1945, no. 55, p. 14

"Larger, taller, more swollen." [Than *porrecta*.] [Carpenter, 1864b, p. 656]

Oldroyd (1927) included a copy of Carpenter's (1864) description. The following corrections in her measurements should be made:

For 65 read .65; for 25 read .25; for 42 read .5; delete "poll;" add "div. 60°."

The final habitat and final remarks furnished herein under *L. porrecta* include this form as well.

The type material consists of 13 specimens of various ages. Some show wide bands. The spire is rufous, and the body whorl is lighter. Such color characteristics are also seen in the specimens of *L. porrecta* and the form *L. exacquata*. The largest specimen of the group in which the spire is the most elevated is figured herein. The label is, "Type Neeah Bay J. G. Swan."

*Syntypes*.—U. S. National Museum, no. 15533

*Distribution*.—Neah Bay, Washington (type); Strait of Juan de Fuca, Washington, to San Francisco, California (Dall)

*Lacuna porrecta putcloides* Dall

*Lacuna porrecta putcloides* (Carpenter ms.) DALL, 1919, *U. S. Nat. Mus., Proc.*, vol. 56, no. 2295, p. 349; DALL, 1921, p. 154; OLDROYD, 1927, vol. II, pt. III, p. 65

This name was an unpublished one of Carpenter and became valid on the publication of Dall, 1919. Therefore, Dall only is the author of the name.

*Lacuna solidula compacta* Carpenter

(Pl. 18, figs. 3, 4)

*Lacuna* (? *solidula*, var.) *compacta* CARPENTER, 1864b, p. 628; Reprint, 1872, p. 114; 1864, *Ann. Mag. Nat. Hist.*, ser. 3, vol. XIV, p. 428; Reprint, 1872, p. 240; COOPER, 1867, *Geog. Cat. Moll.*, Geol. Sur. California, p. 29

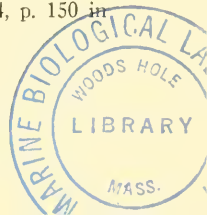
*Lacuna compacta* Carpenter, ARNOLD, 1903, p. 302; Jordan, 1920, *U. S. Nat. Mus., Proc.*, vol. 58, no. 2325, p. 3

Not *Lacuna compacta* Carpenter, ARNOLD, 1907, *U. S. Geol. Sur., Bull.* no. 321, pl. XI, fig. 2

*Lacuna divaricata* TRYON [not FABRICIUS], 1887, *Man. Conch.*, vol. IX, p. 266 in part; DALL, 1921, p. 154 in part; ? OLDROYD, 1924, *Pub. Puget Sound Biol. Station*, vol. 4, p. 150 in part; ? OLDROYD, 1927, vol. II, pt. III, p. 66 in part

*Lacuna solidula carinata* Gould, STRONG, 1924, *Nautilus*, vol. 38, no. 1, p. 17

*Lacuna divaricata carinata* Gould, GRANT AND GALE, 1931, p. 782 in part



"*L. testa L. solidulae*, var., simili; parva, solida, compacta, angusta, subturrita, marginibus, spirae excurvatis: aurantiaca, interdum pallidiore zonata; anfr. subplanatis, suturis distinctis; tota superficie confertissime spiraliter striolata; basi valde angulata, subplanata spir. .1, lat. .17, div. 60°

"Variat testa elongata: variat quoque columella normaliter lacunata.

"*Hab.* Neeah Bay (*Swan*).

"Possibly an extreme form of the very variable *L. solidula*, Lov. (= *L. carinata*, Gld., non A. Ad., = *Modolia striata*, (Gabb), yet distinct in all ages. The young shells resemble small *Litorinae*." [Carpenter, 1864, p. 428]

The type material consists of nine specimens labelled "Type Neeah Bay Swan." The body whorl of the shells has a sharp basal margin. The umbilicus is long; it has a sharp margin above and flares below. The surface is smooth with faint microscopic striae in some places. The largest specimen is figured herein.

In comparing the illustrations of the various types of the Carpenter named forms the dimensions of each should be borne in mind. The photograph of *L. compacta* is enlarged to greater magnification than the others, which are larger in actual measurements.

*L. compacta* has the whorls carinated stronger than any of the other Carpenter Lacunae shells, as well as the illustrations of *L. carinata* Gould or *L. solidula* Lovén.

*L. compacta* has been included under *L. divaricata* (Fabricius)<sup>66</sup> by Tryon, probably by Dall and Oldroyd, as synonymous with *L. solidula carinata* Gould by Strong, and *L. divaricata carinata* Gould by Grant and Gale. Carpenter regarded *L. solidula* Lovén and *L. carinata* as synonymous as did Dall (1925, p. 18, Pl. 34, fig. 2, *L. solidula* Lovén). Grant and Gale maintained each as a distinct subspecies. Woodring, Bramlette, and Kew (1948) believed *L. porrecta* and *L. carinata* equal.

*L. divaricatus* (Fabricius) cannot be used. According to English writers it is equivalent to *L. vineta* Montagu.

*Dimensions*.—Syntypes: height 6 mm., greatest diameter 4 mm. (largest); height 2 mm.; greatest diameter 2 mm.

*Syntypes*.—U. S. National Museum, no. 15530b

*Distribution*.—Neeah Bay, Washington (type)

#### Lacuna unifasciata Carpenter

(Pl. 19, figs. 26, 27)

? *Lacuna unifasciata* CARPENTER *in* GOULD AND CARPENTER, 1856, Zool. Soc. London, Proc., p. 205; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 228, 230, 327; 1860, Smith Misc. Coll., vol. 2, art. 6, p. 4; CARPENTER, 1864b, p. 537, 656; Reprint, 1872, p. 23, 142; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; KEEP, 1887, West Coast Shells, p. 67, fig. 51; TRYON, 1887, Man. Conch., vol. IX, p. 267, pl. 50, 63, 74; not 63-74 as in text.<sup>67</sup> section *Ephera*; Williamson, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 205; ORCUTT, 1915, Moll. World, p. 20; DALL, 1921, p. 154; STRONG, 1923, Nautilus, vol. 37, no. 2, p. 42; 1924, Nautilus, vol. 38, no. 1, p. 17, 18; DALL, 1925, U. S. Nat. Mus., Proc., vol. 66, no. 2554, p. 18, pl. 31, fig. 4; OLDROYD, 1927, vol. II, pt. III, p. 67; GRANT AND GALE, 1931, p. 783; KEEN, 1937, p. 37; BURCH, 1945, no. 55, p. 15; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 64 including *L. u. aurantiaca*; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196; ABBOTT, 1954, p. 131, fig. 36b same fig. as Dall, 1925

Oldroyd included a copy of the original description of this species (1927). The measurements as she copied them should be corrected as follows:

For 23 read .23; for 11 read .11; for 15 read .15; add "alt. 45°;" delete "poll."

The following lines should be added:

"*Hab.* Sta. Barbara (*Col. Jewett*). Mus. Gould.

<sup>66</sup> Fabricius (1780, p. 392). Not *Trochus divaricatus* Linnaeus *vide* Lovén (*in* Forbes and Hanley, 1851, p. 62) = *L. vineta* Montagu, 1803, p. 307, Suppl., 1808, pl. XX, fig. 3. See Harmer, 1921, p. 668.

<sup>67</sup> Typographical error of hyphen for comma in figure numbers may cause confusion unless rectified by comparing with plate explanation.

"This shell has the shape of *Littorina angulifera*, the general aspect of the small *Phasianellac*, and the chink of *Lacuna*. Its operculum is unknown, all the specimens in Mus. Gould being dead."—[Carpenter, 1856d, p. 205]

See "var." *aurantiaca* for Carpenter's remarks (1864).

The type material consists of five specimens labelled "Cotypes Jewett Sta. Barbara." One of the specimens has a rough surface and an operculum. This individual is not consistent with Carpenter's original description, as he stated that the operculum was unknown. Woodring made the same observation and inserted a pencil note to the same effect with the type lot.

The specimen figured herein has a brown line just below and at the suture and continues on the body whorl along the same spiral line (carina). The carina is sharp. All of the other three syntypes are keeled but they do not have the color band. All the specimens are umbilicate.

*Syntypes*.—U. S. National Museum, no. 16257<sup>68</sup> (four specimens).

*Distribution*.—Recent. Santa Barbara, California (type); Monterey, California, to Magdalena Bay, Lower California (Burch). Pleistocene. California (Oldroyd, 1925; Waterfall, 1929; Stephens, 1929; Grant and Gale; Willett, 1937); Mexico (Jordan, 1926)

#### *Lacuna unifasciata aurantiaca* Carpenter

*Lacuna unifasciata aurantiaca* CARPENTER, 1864b, p. 656; Reprint, 1872, p. 142 spelled *aurantia* in index p. 61; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; TRYON, 1887, Man. Conch., vol. IX, p. 267 section *Ephera*; DALL, 1921, p. 154; STRONG, 1924, Nautilus, vol. 38, no. 1, p. 17, 18; OLDROYD, 1927, vol. II, pt. III, p. 67; GRANT AND GALE, 1931, p. 783; KEEN, 1937, p. 37; BURCH, 1945, no. 55, p. 15

"*Lacuna unifasciata*, Cpr. P.Z.S. 1856, p. 205. Small, glossy, generally with a coloured keel, sometimes broken into dots. Var. *aurantiaca*, keel obsolete, resembling the chinked *Phasianellae*. 8–10 fm. Cp." [Carpenter, 1864b, p. 656]

The type has not been found. The type locality may be Santa Barbara, Farallon Islands, or the region between San Diego and San Pedro, as enumerated by Carpenter (1864b) for the species. Carpenter was definite as to the character for separation of the subspecies. However, such a feature is not always consistent.

*Type*.—Not found

*Distribution*.—Recent. Type locality not differentiated; Santa Barbara, California, to Point Abreojos, Lower California (Dall). Pleistocene. California (Oldroyd, 1925; Grant and Gale)

#### *Lacuna variegata* Carpenter

(Pl. 19, figs. 28, 29)

*Lacuna variegata* CARPENTER, 1864b, Aug., p. 628, 656; Reprint, 1864, p. 114, 142; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 428; Reprint, 1872, p. 240; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; 1870, Amer. Jour. Conch., vol. VI, p. 64; TRYON, 1887, Man. Conch., vol. IX, p. 266, pl. 50, not fig. 58;<sup>69</sup> DALL, 1921, questioned fig. 64 ? section *Ephera*; DALL, 1921, p. 154; OLDROYD, 1924, March, Pub. Puget Sound Biol. Station, vol. 4, p. 150; STRONG, 1924, July, Nautilus, vol. 38, no. 1, p. 18; OLDROYD, 1927, vol. II, pt. III, p. 66; KEEN, 1937, p. 37; BURCH, 1945, no. 55, p. 14; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. sur., Prof. Paper 207, p. 65; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196

"Not common; resembles the Japanese *L. decorata*." [Carpenter, 1864b, p. 628]

"Very tall, effuse, irregular with wide chink: clouded or with zigzag stripes: like *decorata*, A. Ad." [Carpenter, 1864b, p. 656]

Oldroyd (1927) supplied a copy of Carpenter's description (1864d). The measurements in that copy should be corrected as follows:

For 3 read .3; for 16 read .16; for 17 read .17; delete "poll."

The following lines should be added to make that copy complete:

". . . Div. 50°.

"Hab. Neeah Bay (*Swan*).

<sup>68</sup> Dall (1919, p. 349) gave 60675 as the U. S. National Museum number. No. 60675 is not the type. Specimen 60675 is labelled, "Typical; figured," *vide* H. A. Rehder (Sept. 19, 1950, personal communication.)

<sup>69</sup> Tryon, pl. 50, fig. 58 = *L. marmorata* Dall (1919) p. 348 *vide* Dall (1921, p. 154)

"Painted like *L. decorata*. A. Ad., which differs in having a normal growth, with very slight chink." [Carpenter, 1864d, p. 428]

The type material of this species consists of 23 specimens, which vary in size. They have a label, "Swan Neeah Bay." Although Carpenter described the umbilicus as wide, that character varies in extent among the syntypes. Most have a large umbilicus with a sharp margin, but on one specimen the umbilicus is closed. The umbilicus is not consistent with age, for its size varies on individuals of similar age or size. The spire is elevated and twisted. The young specimens have a shorter and blunter spire. Two of the syntypes are figured herein. Both of those specimens are umbilicate (widely sunken). The photo of the apertural view does not show this well.

*Syntypes*.—U. S. National Museum, no. 15531

*Distribution*.—Recent. Neah Bay, Washington (type); Neah Bay, Washington, to Santa Monica, California (Keen). Pleistocene. California? Woodring, Bramlette, and Kew)

Family LITTORINIDAE

Genus *Littorina* Ferussac, 1822

*Littorina* FERUSSAC, 1822, Tableau systematique des animaux, Mollusques, p. XXXIV "Littorine"; see WINCKWORTH, 1922, Malacol. Soc. London, Proc., vol. 15, p. 95 and BEQUAERT, 1943, Johnsonia, no. 7, p. 1

Type species by subsequent designation, DE BLAINVILLE, 1828, Dict. Sci. Nat., 56, p. 98, *Turbo littoreus* LINNAEUS, 1758, Syst. Nat., p. 761. Recent. Western Europe. West Atlantic from Labrador to southern New Jersey. BEQUAERT, 1943, Johnsonia, p. 3, pl. 1, figs. 1-11

Subgenus *Algamorda* Dall, 1918

*Algamorda* DALL, 1918, Biol. Soc. Washington, Proc., vol. 31, p. 137 as a section of *Littorina* "typified by *T. littoralis*."

Type species by original designation, *L. newcombiana* (HEMPHILL), 1876, California Acad. Sci., Proc., vol. 7, p. 49. Recent. California. DALL, 1921, U. S. Nat. Mus., Bull. 112, pl. 5, fig. 5

"*Littorina* (? *Algamorda*) *castanea*" Carpenter

(Pl. 18, figs. 7, 8)

Not ? *Paludinella castanea* MÖLLER in MIDDENDORFF, 1849, p. 47, no. 3, pl. 10, figs. 11-15 *fid*e CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856, p. 215 Ochotsk, Lapland

? *Paludinella castanea* CARPENTER, 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 429; Reprint, 1872, p. 241 described as new

Cf. *Paludinella* ? COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29

*Littorina* (? *Algamorda*) *castanea* Carpenter, DALL, 1921, p. 153; OLDROYD, 1927, vol. II, pt. III, p. 63; BURCH, 1945, no. 55, p. 13

*Littorina* "*castanea*" [Carpenter], KEEN, 1937, p. 38

Not *Littorina castanea* DESHAYES, 1843, Hist. Nat. An. sans Vert., 2d ed., t. 9, p. 206

Not *Littorina castanea* ADAMS AND REEVE, 1848, Zool. Voy. Samarang, Moll., p. 49, pl. XI, fig. 8

The following lines should be added to Oldroyd's (1927) copy of the original description of this species.

"Hab. Neeah Bay; one specimen among *Lacunae* (Swan).

"May be an aberrant *Assiminea*." [Carpenter, 1865a, p. 28]

The holotype has a thin brown horny operculum. There are microscopic widely spaced spiral lines over the body whorl faintly seen on the photograph. Color brown, body whorl lighter.

*Holotype*.—U. S. National Museum, no. 16290

*Distribution*.—Neah Bay, Washington (type)

Joshua Baily pointed out to me that he is not sure that this species belongs to *Littorina*. If it does it requires a new name, because the specific name *Littorina castanea* is preoccupied (see synonymy). If it is not a *Littorina*, the species need not be renamed unless the name is preoccupied in the genus in which it is reclassified. The species should not be renamed until the generic position is verified.

**Littorina (Algamorda) subrotundata** (Carpenter)

(Pl. 18, figs. 1, 2)

?*Assimineca subrotundata* CARPENTER, 1864b, p. 628, 656; Reprint, 1872, p. 114, 142; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 429; Reprint, 1872, p. 241; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29

*Assiminia subrotundata* Carpenter, TAYLOR, 1895, Roy. Soc. Canada, Trans., ser. 2, vol. I, sec. IV, p. 81

*Littorina* (? *Algamorda*) *subrotundata* (Carpenter), DALL, 1921, p. 153; OLDROYD, 1927, vol. II, pt. III, p. 63; BURCH, 1945, no. 55, p. 13

*Littorina subrotundata* [Carpenter], KEEN, 1937, p. 38

"Like a very thin *Littorina*: ashen, plain." [Carpenter, 1864b, p. 656]

Oldroyd (1927) published a copy of Carpenter's description (1865). However, the measurements as copied by her should be corrected as follows:

For "28" read ".28" for 13 read ".13"; for 2 read .2; delete "poll."

The following lines should be added to make that copy complete:

"... div. 65°.

"*Hab.* Neeah Bay; one specimen among Lacunae (*Swan*).

"May prove to be a large *Hydrobia*." [Carpenter, 1865a, p. 28]

The holotype is broken and worn (pl. 18, figs. 1, 2). The spire is pointed and elevated.

*Holotype*.—U. S. National Museum, no. 15586

*Distribution*.—Neah Bay, Washington (type)

Subgenus **Melarhapse** Menke, 1828(*Melaraphe* of authors)

*Melarhapse* MENKE, 1828, Synopsis Meth. Moll., p. 23; *vide* BEQUAERT, 1943, Johnsonia, [vol. 1], no. 7, p. 2

Type species by monotypy, *M. glabrata* = *Turbo neritoides* LINNAEUS, 1758, Syst. Nat., ed. X, p. 761; *vide* Bequaert, 1943, Johnsonia, [vol. 1], p. 2. Recent. Southern Europe; Madeira. MAXWELL SMITH, 1940, World-wide Sea Shells, p. 29, fig. 409

**Littorina (Melarhapse) scutulata pullata** Carpenter

*Littorina* [sic] *pullata* CARPENTER, 1864, June, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 477; Reprint, 1872, p. 216; 1864b, Aug., p. 546, 618; Reprint, 1872, p. 32, 104

*Littorina scutulata* Gould, TRYON, 1887, Man. Conch., vol. IX, p. 250 in part, pl. 45, fig. 3

*Littorina (Melarhapse) pullata* Carpenter, BAILY, 1935, West Coast Shells (Keep), p. 199

*Littorina (Melarhapse) scutulata pullata* Carpenter, BURCH, 1945, no. 55, p. 10, 12

This species was described from Cape San Lucas but is recorded by Burch as ranging to Monterey, California

## Family Rissoidae

Genus **Amphithalamus** Carpenter, 1864

*Amphithalamus* CARPENTER, 1864b, p. 614, 656; Reprint, 1872, p. 100, 142; 1866, California Acad. Sci., Proc., vol. III, p. 218; BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 41, p. 263

Type species by original designation, *A. inclusus* CARPENTER, 1864b, p. 614, 656. Recent. Catalina Island to San Diego, California. BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 41, p. 264, fig. 2

*Scrobs* Watson (1866, p. 612), applied to Australian and New Zealand species, has been regarded by some authors (Tryon, 1887, Bartsch, 1911, Suter, 1913) as synonymous with *Amphithalamus*. Both genera may have the unusual shelly reinforcement of the aperture in the parietal and columellar area, but that feature is not constant in either. Iredale (1915, p. 448, 449) maintained the distinctness of the two genera, and Powell (1927, p. 545) aptly pointed out that

"the resemblance of the Austral shells to *Amphithalamus* is merely superficial, prejudiced by the presence of a depression separating aperture from body-whorl. In nuclear characters *Scrobs* is quite unlike *Amphithalamus*, this latter genus having protoconch sculptured with

about fifteen slender spiral threads crossed by numerous very fine axial threads, giving the surface a minutely pitted appearance, while in *Scrobs* the nuclear sculpture is in the form of numerous very fine stippled lines."

*A. tenuis* (Bartsch (1911, p. 264, Fig. 3) is another Californian Recent species of the genus. "*A.*" *lacunatus* Carpenter is not congeneric.

#### ***Amphithalamus inclusus* Carpenter**

*Amphithalamus inclusus* CARPENTER, 1864b, p. 537, 614, 656; Reprint, 1872, p. 23, 100, 142; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 181; Reprint, 1872, p. 283; COOPER, 1867, Geog. Cat. Moll. Geol. Sur. California, p. 30 BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 41, no. 1854, p. 264, fig. 2 lectotype; DALL, 1921, p. 158; STRONG, 1923, Nautilus, vol. XXXVII, no. 2, p. 43; OLDROYD, 1927, vol. II, pt. III, p. 84; KEEN, 1937, p. 29; BURCH, 1945, no. 55, p. 26

*Rissoia inclusa* (Carpenter), TRYON, 1887, Man. Conch., vol. IX, p. 317, 340 section *Amphithalamus*

"Habit of minute *Nematura*; labrum not contracted, but labium in adult travels forward to meet it, leaving a chamber behind. Nucleus cancellated: base bluntly ribbed." [Carpenter, 1864b, p. 656]

The following lines should be changed in Oldroyd's (1927) copy of Carpenter's description (1866):

Delete "poll."

Add:

"... 60°

"Hab. Sta. Barbara (*Jewett*); S. Diego (*Cooper*)."

"This very remarkable little shell bears the same relation to *Rissoia* that *Stoastoma* does to *Helicina*. The peritreme resembles a figure 6 inverted, as on the face of the type. In the disproportionate size of the nuclear whorls it resembles *Vitrinella*". [Carpenter, 1865h, p. 181]

One of the syntypes [three (Bartsch)] is in the original Carpenter vial with the original Carpenter label in white ink on glass, "type S. Diego Cooper." Apparently this is the specimen which Bartsch figured. He presented a full description of the shell.

*Dimensions*.—Length 1.4 mm.; diameter 0.9 mm. (Bartsch)

*Syntypes*.—U. S. National Museum, no. 15573; lectotype, no. 15573X

*Distribution*.—Recent. San Diego, California (type); San Pedro and Catalina Island, California, to Gulf of California (Burch); San Martin Island, Mexico (Baker, 1902). Pleistocene (Woodring, Bramlette, and Kew, 1946)

#### **"*Amphithalamus*" *lacunatus* Carpenter**

? *Amphithalamus lacunatus* CARPENTER, 1864b, p. 613, 657; Reprint, 1872, p. 99, 143; 1866, California Acad. Sci., Proc., vol. III, p. 218; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30; BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 41, no. 1854, p. 263, fig. 1 type; DALL, 1921, p. 158; OLDROYD, 1927, vol. II, pt. III, p. 85; KEEN, 1937, p. 29; BURCH, 1945, no. 55, p. 26

*Rissoia lacunata* (Carpenter), TRYON, 1887, Man. Conch., vol. IX, p. 340

"Same nucleus [as *A. inclusus*]; base chinked, not keeled. (Adult not found.]" [Carpenter, 1864b, p. 657]

The following lines should be added to the copy of Carpenter's description (1866) as published by Oldroyd (1927):

"... div. 50°.

"Hab. San Pedro. *Cooper*."

"Two dead specimens in the shell-washings of Dr. Palmer's consignment to the Smithsonian Institute might have been passed over as the young of *Barlecia subtennis*, but for the possession of exactly the same remarkable nucleus as *A. inclusus*. It is presumed, therefore, that they are congeneric; if so, the adult has not been seen." [Carpenter, 1866a, p. 218]

The holotype is preserved in the original Carpenter vial, on the glass with a label in Carpenter's handwriting, "type Calif. Cooper."

Bartsch figured the holotype and described the shell characters in detail.

As Woodring pointed out (Woodring, Bramlette, and Kew, 1946, p. 65) this species is not typical of *Amphithalamus*. It lacks the peculiar double peristome with a detached area from the columellar and parietal wall and the basal cord of that genus.

*Holotype*.—U. S. National Museum, no. 15564

*Distribution*.—Recent. San Pedro, California (type); San Pedro, to San Diego, California (Burch). Pleistocene (Woodring, Bramlette, and Kew, 1946)

#### Genus *Alvania* (Leach) Risso, 1826

*Alvania* LEACH in RISSO, 1826, Hist. Nat. de l'Europe Meridionale, t. IV, p. 140

Type species by subsequent designation, BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1884, Moll. Marins du Roussillon, vol. I, fasc. 7, p. 282; *Rissoa cimex* (Linnaeus) = *Turbo cimex* LINNAEUS, 1758, p. 761 = <sup>70</sup>*A. freminvillea* Risso, *A. europea* Risso, *A. mammillata*, Risso [species in Risso]; GORDON, 1939, Nautilus, vol. 53, p. 29, type designation, *Alvania freminvillea* RISSO, 1826, Hist. Nat. de l'Europe Merid., t. IV = *Turbo cimex* Linnaeus. Recent. Mediterranean and Adriatic Seas. Upper Pliocene and Pleistocene, Italy and Sicily. TRYON, 1887, Man. Conch., vol. IX, pl. 65, figs. 11, 12; BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1884, pl. XXXIII (not XXXIV), figs. 10-12

#### *Alvania acutilirata* (Carpenter)

(Pl. 22, fig. 14)

*Rissoa acutilirata* CARPENTER, 1864b, p. 613, 656; Reprint, 1872, p. 99, 142; 1866, California Acad. Sci., Proc., vol. III, p. 217; COOPER, 1867, Geog. Cat. Moll., Geol. Sur California, p. 30; KEEP, 1887, West Coast Shells, p. 65; TRYON, 1887, Man. Conch., vol. 9, p. 361, pl. 66, fig. 41 *acutilirata*; ARNOLD, 1903, p. 305, pl. IV, fig. 12 Pleistocene

*Alvania acutilirata* (Carpenter), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 41, no. 1863, p. 352, pl. 31, fig. 3 not type; 1917, U. S. Nat. Mus., vol. 52, no. 2193, p. 679; DALL, 1921, p. 159; OLDROYD, 1927, vol. II, pt. III, p. 101, pl. 82, fig. 3 same as BARTSCH, pl. 31, fig. 3; GRANT AND GALE, 1931, p. 768; BAILY, 1935, West Coast Shells (KEEP), p. 201; KEEN, 1937, p. 29; BURCH, 1946, no. 55, p. 30

*Alvania acutilirata* (Carpenter), BURCH, 1945, no. 55, p. 34; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 65 Pleistocene; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197

"Alvanoid: 15 sharp, distant, spiral riblets, travelling over 18 sharp distant ribs, obsolete in front." [Carpenter, 1864 b, p. 656]

The following lines should be added to Oldroyd's (1927) copy of Carpenter's description (1866):

"Long. 0.09, long. spir. 0.05, lat. 0.05, div. 35°.

"Hab. S. Diego; 1 sp. and fragment in shell-washings. *Cooper*." [Carpenter, 1866a, p. 217]

Bartsch described the shell characters in detail and figured a specimen which in the explanation of the plate is designated as the "type." But the text does not refer to the specimen figured as the type. The specimen in the U. S. National Museum in the Carpenter type collection is labelled "San Diego B. Drift Kelsey." This specimen could not be an original type. Woodring (Woodring, Bramlette, and Kew, 1946, p. 65) also noted that the type is not in the U. S. National Museum.

Fortunately the holotype is in the University of California. Durham kindly furnished the measurements and a photograph of the specimen which is included herein.

*Holotype*.—Museum of Paleontology, University of California, no. 15572

*Distribution*.—Recent. San Diego, California (type); Monterey, California, south to San Martin Island, Lower California (Burch). Pliocene. California (Berry, 1908; Waterfall, 1929; Grant and Gale). Pleistocene. California (Arnold; Waterfall, 1929; Woodring, Bramlette, and Kew, 1946)

#### *Alvania aequisculpta* Keep, 1887

*Alvania aequisculpta* Carpenter in Keep (1887, p. 65) is a *nomen nudum* as far as Carpenter is concerned. The description dates from 1887 with Keep as author. (Bartsch, 1911, p. 358, pl. 32, fig. 7 paratype, U. S. National Museum, no. 219564 *fide* Bartsch.)

Baker (1902, p. 41) used the nude name of Carpenter in a triple capacity, as *Rissoa*, *Rissoina*, and *Alvania*. This adds two *nomina nuda* to the list.

<sup>70</sup> *Fide* Bucquoy, Dautzenberg, and Dollfus (1884, p. 283)



*Alvania carpenteri* (Weinkauff)

*Alvania reticulata* CARPENTER, 1864b, Aug., p. 628, 656; Reprint, 1872, p. 114, 142; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 429; Reprint, 1872, p. 241; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30

Not *Turbo* [= *Alvania*] *reticulatus* MONTAGU, 1803, Testacea Britannica, vol. II, p. 322; 1808, Suppl., pl. 21, fig. 1

*Rissoa carpenteri* WEINKAUFF, 1885, Conch. Cab., ed 2, p. 192 new name for *Alvania reticulata* Carpenter, 1864; TRYON, 1887, Man. Conch., vol. 9, p. 656

*Alvania carpenteri* (Weinkauff), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 41, no. 1863, p. 341, pl. 29, fig. 8; DALL, 1921, p. 158; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 153; 1927, vol. II, pt. III, p. 91, pl. 80, fig. 8 same as BARTSCH, pl. 29, fig. 8; KEEN, 1937, p. 29; SMITH, M., Panamic Marine Shells, 1944, p. 16, fig. 181A same as BARTSCH pl. 29, fig. 8; BURCH, 1945, no. 55; p. 30, 33; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197

"Open network: radiating threads travelling over 12 stronger distant spiral threads." [Carpenter, 1864b, p. 656]

The following corrections and additions should be made in Oldroyd's (1927) copy of Carpenter's description (1864d):

Line 6, read "exsculpta" for "exculpta."

Line 7, read "Long. .085, long. spir. .05; lat. .04, div. 30°" for dimensions as given.

Add:

"*Hab.* Neeah Bay; two specimens in shell—washings (*Swan*)." [Carpenter, 1864d, p. 429]

Bartsch described the shell of this species in detail and figured the type. Oldroyd (1927) included Bartsch's description. According to Carpenter there were two specimens originally. The writer therefore designates the remaining syntype a lectotype.

The Carpenter name of the species is a secondary homonym, and Weinkauff's name is only applicable as long as the two species are put in the same genus.

*Dimensions*.—Length 2 mm.; diameter 1.1 mm. (type, Bartsch)

*Lectotype*.—U. S. National Museum, no. 17728

*Distribution*.—Neeah Bay, Washington (type); Drier Bay, Knight Island, Prince William Sound, Alaska, to Monterey, California (Burch); San Martin Island, Mexico (Baker, 1902); Galapagos Islands (M. Smith, 1944)

*Alvania compacta* (Carpenter)

(Pl. 20, figs. 16, 17, 18, 18A, B, C, D, E)

*Rissoa compacta* CARPENTER, 1864b, p. 603, 656; Reprint, 1872, p. 89; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 62; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30

*Alvania compacta* (Carpenter), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 41, p. 351, pl. 31, fig. 7 not type; 1917, U. S. Nat. Mus., Proc., vol. 52, no. 2193, p. 679; JORDAN, 1920, U. S. Nat. Mus., Proc., vol. 58, no. 2325, p. 3; DALL, 1921, p. 159; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 156; 1927, vol. II, pt. III, p. 95, pl. 82, fig. 7, type, same as BARTSCH, 1911; VOKES, 1936, Nautilus, vol. 50, no. 2, p. 48; KEEN, 1937, p. 29; BURCH, 1945, no. 55, p. 34; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197

"Sculptured like *Beanii*, with short broad whirls [*sic*]." [Carpenter, 1864b, p. 656]

To make Oldroyd's (1927) copy of Carpenter's description (1865) complete the following lines should be changed:

Delete "poll."

Add:

"... div. 45°.

"*Hab.*—In sinu Pugetiano satis abundanter legit Kennerley; prope Neeah Bay, Swannii discipuli." [Carpenter, 1865e, p. 62]

The type material in the U. S. National Museum consists of four specimens with the original glass and label. The card label is, "Puget Sd Kennerly type."

Bartsch figured a specimen from Alaska but not one of Carpenter's syntypes. The explanation of the figure defined the specimen as "type" which would seem to be a confusion in



printing. Bartsch discussed the shell characters of the species in detail. His description was reprinted by Oldroyd.

Photographs of the four syntypes are illustrated herein.

*Syntypes*.—U. S. National Museum, no. 4338

*Distribution*.—Puget Sound, Washington (type); Port Etches, Alaska, to Trinidad, California (Dall)

#### *Alvania filosa* Carpenter

*Alvania filosa* CARPENTER, 1864b, p. 628, 656; Reprint, 1872, p. 114, 142; 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 429; Reprint, 1872, p. 241; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30 "Monterey;" 1870, Amer. Jour. Conch., vol. VI, p. 65 "Monterey;" BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 41, p. 342, pl. 30, fig. 7 type; DALL, 1921, p. 159; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 154; 1927, vol. II, pt. III, p. 92; KEEN, 1937, p. 29; BURCH, 1945, no. 55, p. 33; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197

*Rissoa filosa* (Carpenter) TRYON, 1887, Man. Conch., vol. IX, p. 365

"Turritid: pillar purple-stained: 18 close spiral striae, passing over very faint waved riblets." [Carpenter, 1864b, p. 656]

The following lines should be changed in Oldroyd's (1927) copy of Carpenter's description (1864d):

Delete "poll."

Add:

". . . div. 20°.

"*Hab.* Neeah Bay; one specimen in shell-washings (*Swan*)."<sup>71</sup> [Carpenter, 1864, p. 429]

The holotype has the original Carpenter glass with the original label, "Neeah Bay Swan type."

Bartsch figured the holotype and discussed the specific characters in detail.

*Dimensions*.—Length 3.5 mm.; diameter 1.7 mm. (Bartsch)

*Holotype*.—U. S. National Museum, no. 36632

*Distribution*.—Neah Bay, Washington (type); Neah Bay north to Hoonah, Alaska (Burch)

#### "*Alvania notabilis* Cpr."

"*Alvania notabilis* Cpr." in Baker (1902, p. 41) is a *nomen nudum*. The "Cpr." is an error for C. B. Adams who described the species from Panama (1852, p. 180) as *Rissoa*; Carpenter (1863, p. 353; Reprint, 1872, p. 189)

#### Genus *Rissoina* d'Orbigny, 1840

#### *Rissoina woodwardi* Carpenter

Cooper (1888, p. 262) reported *Rissoina woodwardi* Carpenter from the "Quaternary" of San Diego. This species was described by Carpenter (1857, p. 357) from Mazatlan, Mexico. Bartsch (1915, pl. 31, fig. 2, 5) figured a Carpenter drawing of a syntype. The species has not been reported, other than the Cooper reference above, from the California region, living or fossil. Cooper's record, therefore, seems to be a misidentification.

#### (Family Barleeiidae)

#### Genus *Barleeia* Clark, 1853<sup>71</sup>

*Barleeia* CLARK, W., 1853, Ann. Mag. Nat. Hist., ser. 2, vol. XII, p. 110

Type species by monotypy, *Barleeia rubra* John Adams, CLARK, 1853, Ann. Mag. Nat. Hist., ser. 2, vol. XII, p. 108–109 "*Rissoa rubra auct.*"<sup>72</sup> Recent. Europe. TRYON, 1887, Man.

<sup>71</sup> This original date antedates that of Clark, (1855, p. 391–395; (Bartsch, 1920a, p. 166–167), even though Clark (1855) described the genus as new.

<sup>72</sup> There is some question as to whether the *Turbo ruber* John Adams (1797, p. 66, pl. 13, figs. 21, 22) is the same as that of Montagu (1803, p. 320) as *Turbo ruber* Adams *vide* Forbes and Hanley 1854 (probably). Winckwath (1932, p. 223) used *Rissoa rubra* as of Forbes and Hanley.

Conch., vol. 9, pl. 60, figs. 70, 71 copy of SOWERBY (REEVE), 1878, Conch. Icon., vol. 20, *Rissoa*, pl. VI, fig. 54 copy of ADAMS, 1797, Linn. Soc. Trans., vol. III, pl. XIII, fig. 15 *vide* SOWERBY (1878)

**Barleeia alderi** (Carpenter)

*Jeffreysia Alderi* CARPENTER, 1857, Mazatlan Cat., p. 362; 1864b, p. 623, 657; Reprint, 1872, p. 109, 143; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 31

*Barleeia alderi* (Carpenter), BARTSCH, 1920, U. S. Nat. Mus., Proc., vol. 58, no. 2331, p. 175, pl. 12, fig. 6 type; BURCH, 1945, no. 55, p. 23

This species described from Mazatlan by Carpenter was reported later by him from San Diego. That record was repeated by Cooper. This occurrence has not been verified by later collectors. The distribution so far is limited to Gulf of California to Tres Marias Islands (Burch). The synonymy is not intended to be complete.

**Barleeia haliotiphila** Carpenter

*Barleeia haliotiphila* CARPENTER, 1864b, p. 656; Reprint, 1872, p. 142; 1865, Jour. de Conchyliol., vol. XIII, p. 144; Reprint, 1872, p. 312; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30; KEEP, 1887, West Coast Shells, p. 64; TRYON, 1887, Man. Conch., vol. IX, p. 393, pl. 60, fig. 74; BARTSCH, 1920, U. S. Nat. Mus., Proc., vol. 58, no. 2331, p. 172, pl. 13, fig. 1 type; DALL, 1921, p. 156; STRONG, 1923, Nautilus, vol. 37, no. 2, p. 43; OLDROYD, 1927, vol. II, pt. III, p. 75; STRONG, 1928, Nautilus, vol. 42, no. 1, p. 1; BALLY, West Coast Shells (KEEP), p. 202; KEEN, 1937, p. 30; BURCH, 1945, no. 55, p. 22-24; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196

"Longer, narrower, much smaller. On *H. splendens*." [Carpenter, 1864b, p. 656]

The following changes should be made in Oldroyd's (1927) copy of Carpenter's description (1866):

Line 4: read "labio parum" for "labro parum"; delete "poll."

Add:

". . . div. 30°.

"*Hab.* Basse Californic, sur la partie dorsale d'une *Haliotide*, Rowell.

"Cette espèce est voisine du *B. subtennis*; elle s'en distingue par sa taille beaucoup plus petite, et sa forme plus élancée." [Carpenter, 1865g, p. 144]

The holotype was figured by Bartsch, who gave a detailed description of the shell.

*Dimensions*.—Altitude 2.5 mm.; diameter 1.3 mm. (Bartsch)

*Holotype*.—U. S. National Museum, no. 15558

*Distribution*.—Recent. Lower California on *Haliotis* (type); Mendocino County, California, to Lower California (Dall). Pleistocene (Woodring, Bramlette, and Kew, 1946)

**Barleeia marmorea** (Carpenter)

(Pl. 22, fig. 9)

*Diala marmorca* Carpenter, 1864b, p. 613, 657; Reprint, 1872, p. 99, 143; 1866, California Acad. Sci., vol. III, p. 218; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 31; 1870, Amer. Jour. Conch., vol. VI, p. 65; DALL, 1921, p. 156; 1923, U. S. Nat. Mus., Proc., vol. 63, p. 3 corrections? *Barleeia*: OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 152; 1927, vol. II, pt. III, p. 78; STRONG, 1923, Nautilus, vol. 37, no. 2, p. 43; GRANT AND GALE, 1931, p. 784; KEEN, 1937, p. 30; BURCH, 1945, no. 5.

*Litiopa marmorca* (Carpenter) TRYON, 1887, Man. Conch., vol. IX, p. 283, pl. 53, fig. 87

*Barleeia marmorca* (Carpenter), DALL, 1922, Nautilus, vol. 35, no. 3, p. 85; BURCH, 1945, no. 55, p. 21, 22; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur. Prof. Paper 207, p. 67; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 197

"Solid, glossy, clouded with red; base faintly angled." [Carpenter, 1864b, p. 657]

Oldroyd (1927) republished Carpenter's description (1866). To that copy the following lines should be added:

"Long. 0.17, long. spir. 0.11, lat. 0.08, div. 31°.

"*Hab.* Monterey, S. Pedro; *Cooper*. Lower California, off *Haliotis*, Rowell.

"The description is written from a single perfect specimen in Mr. Rowell's collection, and some fragments from the shell-washings of Dr. Cooper's." [Carpenter, 1866a, p. 218]

The holotype of this species is in the original vial of Carpenter with the original label, "Type S. Pedro."

The holotype has been drilled vertically by some animal which left a circular opening in the posterior columellar area under the overhang of the whorl. It is visible in the photograph and appears like a misplaced umbilicus.

Burch (1945 no. 55, p. 24) suggested that the listing of *Diala marmorea* by Baker (1902, p. 41) is a misidentification, as he believed *D. acuta* is the southern form, although in the range of *B. marmorea*, he extended the boundary to Lower California.

A comparison of the illustrations herein of the two above-mentioned species reveals the difference in the angulation of the body whorl of the forms.

*Holotype*.—U. S. National Museum, no. 14821

*Distribution*.—Recent. San Pedro, California (type); Queen Charlotte Islands, British Columbia, to San Pedro, California (Dall); San Martin Island, Mexico (Baker 1902). Pleistocene. California (Clark, 1931; Woodring, Bramlette, and Kew 1946) Pliocene. California (Berry, 1908)

### *Barleeia subtenuis* Carpenter

(Pl. 20, figs. 1-3)

*Hydrobia ulvae* CARPENTER, 1857, Cat. Mazatlan Shells, p. 361

*Barleeia subtenuis* CARPENTER, 1864b, p. 546, 623, 656, 669; Reprint, 1872, p. 32, 109, 142, 155; 1865, Jour. de Conchyl., vol. XIII, 143; Reprint, 1872, p. 311; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30; KEEP, 1887, West Coast Shells, p. 65; TRYON, 1887, Man. Conch., vol. IX, p. 393, pl. 60, fig. 73; BARTSCH, 1920, U. S. Nat. Mus., Proc., vol. 58, no. 2331, p. 169, pl. 13, fig. 11; DALL, 1921, p. 156; STRONG, 1923, Nautilus, vol. 37, no. 2, p. 43, OLDROYD, 1927, vol. II, pt. II, p. 74; STRONG, 1928, Nautilus, vol. 42, no. 1, p. 1; BAILY, 1935, West Coast Shells (KEEP), p. 202; KEEN, 1937, p. 30; BURCH, 1945, no. 55, p. 24; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197

*Rissoa cooperi* TRYON, 1865, Amer. Jour. Conch., vol. I, p. 222, pl. 22, fig. 13 *vide* Bartsch; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30; 1870, Amer. Jour. Conch., vol. VI, p. 65; TRYON, 1887, Man. Conch., vol. IX, p. 369 Amnicolidae.

"= *Hydrobia* ? *ulvae*, Maz. Cat. no. 417; but with normal Barleeoid operculum. On grass, Cp." [Carpenter, 1864b, p. 656]

The following should be changed in Oldroyd's (1927) copy of Carpenter's description (1865):

Line 3: read "peritremate" for "peritrenate"; line 4: read "lacunam" for "lacunem"; line 6; read "exstante" for "extante"; ".11" for ".11."

Add:

". . . div. 40°

"Hab. S. Diego, *Cassidy*; sur l'herbe, *Cooper*.—Cape St. Lucas, *Xantus*.—Mazatlan, *Reigen*.

"Si l'on juge seulement d'après la coquille, on ne peut guère séparer cette espèce des petites variétés dégradées de l'*Hydrobia ulvae* d'Europe. J'avais rapporté à cette espèce quelques individus, en très-mauvais état, de la collection Reigen (Maz. Cat., no. 417). Mais les individus frais qui ont été recueillis, grâce au zèle du docteur Cooper, possèdent l'opercule remarquable des *Barleeia*." [Carpenter, 1865g, p. 144]

Three specimens in the U. S. Nat. Museum (no. 32363) are now labelled "type" and stated to be figured by Bartsch. One label has "P.P.C." with no locality. The three specimens are each figured herein. They are not labelled "type" in the catalogue, (U. S. National Museum), and they do not correspond to Bartsch's statement (1920, p. 170) as to type.

Bartsch (1920) explained in the text concerning the species that the specimen figured is one of 147 of no. 56446, and that the shells came from San Diego. In the explanation of the figure in the same article (and in the column on p. 170), the figure is labelled "type."

Since apparently a holotype selected by Carpenter is not available, the specimen figured by Bartsch could be designated as the neotype. This specimen is not a lectotype in the strict sense, for material from which it would be selected is not in the original collection.

*Specimens figured*.—U. S. National Museum, no. 32363

*Distribution*.—San Diego, California (type, based on neotype if and when selected); San Pedro, California

**Barleeia subtenuis rimata** Carpenter

(Pl. 20, fig. 4)

*Barleeia* (? *subtenuis*, var.) *rimata* CARPENTER, 1864b, p. 656; Reprint, 1872, p. 142; 1865, Jour. de Conchyl., vol. XIII, p. 144; Reprint, 1872, p. 312, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 30; TRYON, 1887, Man. Conch., vol. IX, p. 393; DALL, 1921, p. 156; OLDROYD, 1927, vol. II, pt. III, p. 74; KEEN, 1937, p. 30 differentiated; BURCH, 1945, no. 55, p. 24

*Barleeia subtenuis* Carpenter, BARTSCH, 1920, U. S. Nat. Mus., Proc., vol. 58, no. 2331, p. 169

"Whirls [*sic*] more swollen. [than *subtenuis*]: base chinked—[Carpenter, 1864b, p. 656]

"B.t. "B. subtenui" simili; sed paulum tumidiore; aufractibus minus planatis; rima umbilicali conspicua.

"Hab. S. Diego. *Cassidy, Cooper.*

"Peut-être cette forme se trouvera-t-elle constituer une espèce distincte, lorsqu'elle sera mieux connue." [Carpenter, 1865g, p. 144]

Two specimens, in the U. S. National Museum, are segregated with Carpenter types but are not marked "type." They are labelled "San Diego Cooper." For lack of more definite type material the better preserved of the two is figured herein, and the writer presumes that it may eventually be selected as the neotype of the subspecies if such classification seems warranted.

As far as the conspicuousness of the slight umbilical opening is concerned, that of the specimens noted would seem to be within legitimate variation of the species.

This name and data are arranged separately from that of the species for easier reference, rather than because the writer regards the subspecies as valid.

*Specimen figured*.—U. S. National Museum, no. 23734

*Distribution*.—San Diego, California (type)

Genus *Diala* A. Adams, 1861

*Diala* A. ADAMS, 1861, Ann. Mag. Nat. Hist., ser. 3, vol. 8, p. 242, *D. varia* A. Adams first of four species described

Type species by subsequent designation, SUTUR, 1913, (Man. New Zealand Moll., p. 227)<sup>73</sup>

*D. varia* A. ADAMS, 1861, Ann. Mag. Nat. Hist., ser. 3, vol. 8, p. 243

Recent. China, Korea, and Japan

Tryon (1887, p. 282) included *D. varia* Adams under *D. semistriata* Philippi (1849, p. 34).

Tadashige Habe wrote (Aug. 8, 1950, personal communication) that *Diala varia* A. Adams is not the same as *D. semistriata* Philippi.

**Diala acuta** Carpenter

(Pl. 22, fig. 15)

*Diala acuta* CARPENTER, 1864b, p. 613, 657; Reprint, 1872, p. 99, 143; 1866, California Acad. Sci., Proc., vol. III, p. 218; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 31; 1870, Amer. Jour. Conch., vol. VI, p. 65; KEEP, 1887, West Coast Shells, p. 62; COOPER, 1888, 7th Ann. Rept. California State Min., p. 238; DALL, 1921, p. 156; OLDROYD, 1927, vol. II, pt. III, p. 78; GRANT AND GALE, 1931, p. 784; BAILY, 1935, West Coast Shells (KEEP), p. 201; KEEN, 1937, p. 35; WOODRING, BRAMLETTE AND KEW, 1946, U. S. Geol. Sur., Prop. Paper 207, p. 67; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197

*Littopa acuta* (Carpenter), TRYON, 1886, Man. Conch., vol. IX, p. 284

*Barleeia acuta* (Carpenter), BAKER, 1902, Nautilus, vol. 16, no. 4, p. 41; BURCH, 1945, no. 55, p. 21, 22

"Base flattened, sharply angled: turritid. Bch.—10 fm. Cp." [Carpenter, 1864b, p. 657]

Oldroyd (1927) republished the description of Carpenter (1866). The following lines should be added to Oldroyd's (1927) copy of Carpenter's (1866) description:

"... State Collection, no. 390

"*Hab.* Catalina Is. 8–10 fms.; on beach to Monterey. *Cooper.*" [Carpenter, 1866a, p. 218]

The holotype is in an original Carpenter vial with an original label, "Cp. (type) Cp. 390 *Diala acuta* Cpr. Catalina Is."

<sup>73</sup> Fortunately this is an earlier selection of type species than that of Cossmann (1921, p. 56). He designated the same species, but a typographical error (fig. 88 for fig. 81) made his complete explanation confusing.

Dall's reference (" ? pl. 53, fig. 86" in Tryon, 1887) to *Litiopa leithi* Smith is not this species.

*Holotype*.—U. S. National Museum, no. 390 (early California State Survey number, see Carpenter description)

*Distribution*.—Recent. Catalina Island, California (type); Puget Sound, Washington, to San Martin Island, Mexico (Baker) to San Hipolito (Jordan; Burch). Pleistocene. California. (Oldroyd)

#### Family Assimineidae

#### Genus *Assiminea* Leach in Fleming, 1828

*Assiminea* Fleming,<sup>74</sup> 1828, History of British Animals, p. 275; *Assiminia*, p. 557 called vernacular by Fleming

Type species by monotypy *A. grayana* FLEMING, 1828. History of British Animals, p. 275 Recent. Britain.

Because there seems to be doubt in the minds of workers who have not seen Gray (1821, p. 239) as to the status of *Syncera* (supposed to be proposed there as a genus) the following is a copy of the only mention the writer can find in that work in regard to *Syncera*.

"*Nerita Syncera Hepatica*, N. S.—The animal of this shell differs from all the others of this order, by the eyes appearing to be at the ends of the tentacula; but, I believe, that they are placed on a peduncle as long as the tentacula, and the peduncle and tentacula are sordered [*sic*] together. . . ."

One cannot regard this name as a valid generic proposal,<sup>75</sup> and hence the name *Syncera* as of that reference would not have priority over *Assiminea*.

#### *Assiminea translucens* (Carpenter)

*Jeffreysia translucens* CARPENTER, 1864b, p. 613, 657; Reprint, 1872, p. 99, 143; 1866, California Acad. Sci., Proc., vol. III, p. 219; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 31; TRYON, 1887, Man. Conch., vol. IX, p. 397; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 206

*Hydrobia californica* TRYON, 1865, Amer. Jour. Conch., vol. 1, p. 221, pl. 22, fig. 11

*Syncera translucens* (Carpenter), BARTSCH, 1920, U. S. Nat. Mus., Proc., vol. 58, p. 164, pl. 12, fig. 7; DALL, 1921, p. 161; STRONG, 1923, Nautilus, vol. 37, no. 2, p. 43; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 158; 1927, vol. II, pt. III, p. 110; STRONG, 1928, Nautilus, vol. 42, no. 1, p. 1; GRANT AND GALE, 1931, p. 787; BAILY, 1935, West Coast Shells (KEEP), p. 202, fig. 186; KEEN, 1937, p. 46

*Assiminea translucens* (Carpenter), BURCH, 1946, no. 56, p. 8; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197

"Possibly a *Barlecia*: pillar thickened, base rounded." [Carpenter, 1864b, p. 657]

The following should be added to Oldroyd's (1927) copy of Carpenter's description (1866):

"Long. 0.08, long. spir. 0.045, lat. 0.06, div. 55°.

"*Hab.* S. Diego; in shell-washings. *Cooper*."

"Only one specimen having been seen, without animal or even operculum, the genus is doubtful. In its slight labial deposit it resembles "*Litiopa dubiosa*, C. B. Adams." [Carpenter, 1866a, p. 219]

There are 20 specimens in the U. S. National Museum, no. 126645, which are segregated as Carpenter "type" material, one of which is labelled as the "lectotype" of Bartsch. The label of the specimens is "Vancouver Is. Taylor." That specimen labelled lectotype is not the one figured as "type" by Bartsch (1920). The plate explanation defined the specimen as "type," and in the text the specimen stated to be described and figured was U. S. National Museum no. 271483 and came from San Diego, California. This specimen could be selected as a neotype whereas U. S. National Museum no. 126645 could not. The type locality is San Diego, as stipulated by Carpenter, and therefore a Vancouver shell (no. 126645) would not be eligible.

<sup>74</sup> Fleming stated that Leach sent him the shell with name [MS.] *Assiminea grayana*. Fleming described the species and genus.

<sup>75</sup> Iredale (1922, p. 37) reprinted the above lines. Dall, at the same time (1922, p. 36) attested to the validity of the name.

In Bartsch's column of specimens examined, no. 126645 is the first of specimens listed, and no. 271483 has an indication as "type." There apparently has been some mixture of labels.

The specimens of no. 271483 are C. R. Orcutt San Diego material (427 shells) and therefore not the original individual which Carpenter had when he described the species. The Cooper specimen ("only one") has not been found. Bartsch's selection would be a neotype.

*Types*.—Holotype, not found. Specimen figured by Bartsch, U. S. National Museum, no. 271483

*Distribution*.—Recent. San Diego, California (type); Vancouver Island, to Lower California (Dall). Pleistocene. California (Oldroyd, 1925; Grant and Gale); Mexico (Jordan, 1926)

Family TURRITELLIDAE

Genus *Turritella* Lamarck, 1799

*Turritella* LAMARCK, 1799, Soc. Hist. Nat. Paris, Mem., ser. 1, t. 1, p. 74

Type species by monotypy, *Turbo terebra* LINNAEUS, 1758, p. 766. Living. China and East Indies.<sup>76</sup> TRYON, 1886, Man. Conch., vol. VIII, p. 195, pl. 59, figs. 32, 33

*Turritella cooperi* Carpenter

(Pl. 20, fig. 7)

*Turritella cooperi* CARPENTER, 1864b, p. 612, 655; Reprint, 1872, p. 141; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 216; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28; TRYON, 1886, Man. Conch., vol. VIII, p. 200, pl. 61, fig. 61; KEEP, 1887, West Coast Shells, p. 73, fig. 58; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 269; WILLIAMSON, 1892, U. S. Nat. Mus., vol. 15, no. 898, p. 205; ARNOLD, 1903, p. 300; 1907, U. S. Nat. Mus., Proc., vol. 32, p. 546, pl. 51, fig. 14; ELDRIDGE AND ARNOLD, 1907, U. S. Geol. Sur., Bull. 309, pl. 41, fig. 14; DALL, 1921, p. 152; OLDROYD, 1927, vol. II, pt. III, p. 55, GRANT AND GALE, 1931, p. 770 see for additional references; KEEN, 1937, p. 49; BURCH, 1945, no. 54, p. 47; MERRIAM, 1941, Univ. California Pub., Bull. Dept. Geol. Sci., vol. 26, no. 1, p. 117, pl. 33, figs. 1-4; pl. 34; figs. 9, 12-16; pl. 35, figs. 14, 15; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 69-70, pl. 35, fig. 9 Pleistocene; SMITH AND GORDON, 1948, California Acad. Nat. Sci., Proc., ser. 4, vol. XXVI, p. 196

"... S. Diego; Cat. Is.; common. [May prove identical with one of Conrad's imperfectly described fossils in P.R.E.E.]" [Carpenter, 1864b, p. 612]

"Extremely slender, with many narrow whirls. *c. Cp.*" [Carpenter, 1864b, p. 655]

The following lines should be added to Oldroyd's (1927) copy of Carpenter's description (1866)

"... State Collection, no. 564. . . .

"*Hab.* San Pedro, 60; San Diego, 16 dead on beach; Santa Barbara, 4 dead, in 16-20 fms. *Cooper.*

"As I have seen no complete list of the very numerous fossil species of this genus, it appears allowable, rather than risk a synonymy, to name this graceful shell after its discoverer." [Carpenter, 1866a, p. 216]

J. Wyatt Durham furnished the following notes regarding specimens of *T. cooperi* in the Museum of Paleontology, University of California:

"With regard to the types of *Turritella cooperi* Carpenter, we have several specimens in the old California State collections under number 548. Carpenter originally described the species as number 564, but in Cooper's catalogue of the collection 564 is listed as *Goniobasis silicula* and number 548 is the only *Turritella cooperi* listed by him. None of the specimens is designated as type, but two of them have been pasted on a card at one time. Of these two specimens, one is a fossil and the other appears to be a beach worn Recent specimen. Both fit the general description given by Carpenter in the Proc. Calif. Acad. Sci. description, except that neither one has the color markings noted by him. However, his description notes that Cooper had a large number of specimens, and I am wondering if the description may have been a composite.

"With respect to the measurements given by Carpenter the fossil specimen that had been pasted on the card fits them approximately. The apex of the specimen has had a slight amount broken off in recent years, and except for this, would appear to have just about the right altitude and right height of spire and has approximately the right diameter."

<sup>76</sup> Hanley (1855, p. 348); Buequoy, Dautzenberg, and Dollfus, (1886, p. 225); Tryon, (1886, p. 197). The European *T. terebra* = *T. communis* Risso.

The holotype of this species has not been found, nor has original material other than the University of California specimens. One of those could be selected as a neotype. The figure included herein is a copy of the original drawing which Cooper sent Carpenter for identification. The original figure is with the Carpenter ms. notes in the Redpath Museum.

Merriam discussed fully and illustrated specimens of the species.

*Holotype*.—Not found

*Distribution*.—Recent. California (Type—depending on selection of neotype), Monterey, California, to Cerros Island (Baker); Miocene-Recent. California (Merriam)

#### *Turritella jewetti* Carpenter

*Turritella Jewetti* CARPENTER, 1864b, p. 539, 655; Reprint, 1872, p. 25, 141; 1866, April, Ann. Mag. Nat. Hist., ser. 3, vol. XVII, p. 276; Reprint, 1872, p. 323; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28; 1888, 7th Ann. Rept. California State Min. Bur., p. 269. DALL, 1921, p. 151 in part; VAN WINKLE [Palmer], 1921, Bull. Amer. Paleont., vol. VIII, no. 36, p. 4; Oldroyd, 1927, vol. II, pt. III, p. 54 in part; GRANT AND GALE, 1931, p. 770 in part; KEEN 1937, p. 49 in part; MERRIAM, 1941, Univ. California Pub., Bull., Dept. Geol. Sci., vol. 26, no. 1, p. 123; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 69

Not *Turritella jewetti* ARNOLD, 1903, p. 300, pl. IV, fig. 13; ELDRIDGE AND ARNOLD, 1907, U. S. Geol. Sur., Bull. 309, pl. 41, fig. 15; GRANT AND GALE, 1931, p. 770 in part = *T. pedroensis* APPLIN ms. in MERRIAM, 1941, p. 121, pl. 35, figs. 1-9; HANNA AND HERTLEIN, 1941, California Div. Mines, Bull. 118, pt. 2, p. 174, fig. 64-2; BURCH, 1945, no. 54, p. 46

"Like *sanguinea*, with very faint sculpture." [Carpenter, 1864b, p. 655]

Oldroyd (1927) furnished part of Carpenter's description (1866), and Merriam (1941) supplied a complete copy. To Oldroyd's copy the following lines should be added:

"*Hab.* Sta. Barbara, Pleistocene formation (*Jewett*). San Diego, on beach (*Cassidy*).

"This species comes nearest to *T. sanguinea* Rve., from the Gulf, but differs in the faintness of the sculpture. Mr. Cassidy's specimens may be washed fossils, or very poor recent shells." [Carpenter, 1866b, p. 276]

In 1921 the author discovered in the Jewett Collection of the Paleontological Laboratory at Cornell University two of the assumed lost types of the article in which *T. jewetti* was described. Unfortunately the type of *T. jewetti* was not found, nor has it turned up at Cornell or at any other institution.

The *T. jewetti* of Arnold and others from the Pleistocene of the San Pedro area was separated by Esther Richards Applin from the true *T. jewetti* because it did not conform with the original remarks. Her manuscript name, *T. pedroensis*, was published with description and illustration by Merriam (1941, p. 121).

The problem of locating topotypes which have been identified by Carpenter from which a neotype might be selected has not been satisfactorily solved.

Durham furnished the following information in regard to specimens at the University of California:

"There are two specimens in the old California State Collection under number 549 labeled as '*Turritella jewettii* Cpr., Santa Barbara; Jewett Coll. fossil?)." These specimens still have the color markings and from the label the possibility appears to me that they might be a part of the Jewett collection, although the entire label is a printed label made up by Cooper with the notation 'Coll. Cooper' on it."

The writer has not investigated these specimens. Since the West Coast *Turritella* monographs were prepared from material in California, it seems the specimens might have been considered. However, it would be well that the specimens be examined to determine whether they are *T. cooperi* or not.

Woodring (in Woodring, Bramlette, and Kew, p. 69) described a specimen in the U. S. National Museum which probably had been examined by Carpenter. His final opinion was that the specimen was doubtless *T. cooperi*. The writer examined the specimen and agrees with Woodring that it is what has been identified as *T. cooperi*.

In the Redpath Museum there is a specimen (no. 3141) labelled by Carpenter, "*T. jewettii*, jun fossil Sta. Barbara." The specimen, however, is not a young shell as stated. It measures

43 mm. length and 15 mm., greatest diameter. Because of the discrepancy the writer has not included the illustration of the shell. The shell is of the *T. cooperi* stock. It has a subquadrate aperture as described by Carpenter for both *T. cooperi* and *T. jewetti*.

A specimen of *Turritella* (no. 15834) in the Crooke Collection, American Museum of Natural History, is labelled "*T. jewetti* Carp. California." Although the Crooke Collection was acquired probably earlier than 1894 (John C. Armstrong, July 17, 1951, personal communication) there is no evidence that Carpenter identified this shell, and the locality is not adequate. An examination of the shell shows it to be the apical whorls of *T. cooperi* Carpenter. The specimen is a fossil.

Two suites of specimens of two each are in the Museum of Comparative Zoölogy, Cambridge, Massachusetts.

One set (no. 29399) has a printed label, "*Turritella jewettii* Cpr. Santa Barbara: (Jewett Coll., fossil?) 549 California Geol. Survey Jewett." These two specimens are fossil and most certainly from a lot of shells similar to those described by Durham, which are at present at the University of California. The specimens are presumably those sent out by Cooper, as Cooper was employed by the California Geological Survey. This suite, as well as the following second set, is at present labelled "cotypes," but since the two sets probably do not represent original Jewett specimens identified by Carpenter they cannot qualify as "cotypes."

The second set (no. 142835) consists of two Recent shells which have the original label. "*Turritella Jewettii* Cpr. Sta. Barbara, Cal. Cooper."

One shell of the first suite is too badly worn for accurate identification. The remaining three specimens are what is being identified as *T. cooperi* and equal specifically the other specimens enumerated under this discussion. All except the Redpath Museum specimen are apical whorls and are equivalent to the specimen figured by Merriam (pl. 33, fig. 1).

If *T. cooperi* and *T. jewetti* prove to be conspecific, *T. cooperi* has priority. Both names were first briefly described by Carpenter (1864b, p. 655). *T. cooperi* is listed first on that page. Carpenter's first descriptions (1864) of both consist of only one line, which is not adequate to validate the name of the species as of that date. *T. cooperi* was described in February (1866a), and *T. jewetti* in April (1866b). Merriam failed to include the 1866a reference in the synonymy of *T. cooperi*. That is the description which enumerates characters sufficiently for identification.

*Holotype*.—Not found

*Distribution*.—Pleistocene. Santa Barbara, California (type)

#### Genus *Tachyrhynchus*<sup>77</sup> Mörch, 1868

(*Tachyrhynchus* Mörch, 1875)

*Tachyrhynchus* MÖRCH, 1868, Amer. Jour. Conch., vol. 4, p. 46 *Tachyrhynchus* not italicized. Type species by subsequent designation, COSSMANN,<sup>78</sup> 1912, Essais Paléonconch. Comp., 9 liv., p. 110. *Turritella lactea* MÖLLER, 1842, Index Moll. Groenlandica, p. 9 = *Turritella reticulata* MIGHELS AND ADAMS, 1842, Boston Soc. Nat. Hist., vol. IV, Jan., p. 50, pl. IV, fig. 19. Recent. Labrador and the Gulf of St. Lawrence. CLENCH AND TURNER, 1950, Occ. Paper Moll., vol. 1, no. 15, pl. 40, figs. 14-15

#### *Tachyrhynchus lacteolum* (Carpenter)

(Pl. 20, fig. 5)

*Mesalia lacteola* CARPENTER, 1864b, p. 603, 607, 655, 680, 683; Reprint, 1872, p. 89, 93, 141, 166, 169; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 62; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28

*Turritella reticulata* (Mighels and Adams), TRYON, 1886, Man. Conch., vol. VIII, p. 208 in part not figures, section *Turritellopsis*

*Tachyrhynchus lacteola* (Carpenter) SMITH, 1915, Ann. Mag. Nat. Hist., 8th ser., vol. XV, p. 376, fig. 3

<sup>77</sup>Mörch (1875, p. 127) corrected the spelling to *Tachyrhynchus*. The name is derived from the Greek *rhynchos* (n.) beak, snout. The ending of the specific name is neuter instead of either masculine or feminine as often written. (*Note*: After this paper was submitted for publication the International Commission on Zoological Nomenclature, Declaration 39, 1958, reversed its former decision and ruled that such endings are masculine.)

<sup>78</sup>The designation of Cossmann is 3 years before that of E. A. Smith (1915, p. 373 *T. reticulata* Mighels and Adams, 1842). The result is the same in both designations.



*Tachyrhynchus lacteolus* (Carpenter), DALL, 1921, p. 152, pl. 6, fig. 2; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 148, pl. 5, fig. 8; 1927, vol. II, pt. III, p. 58; pt. II, pl. 31, fig. 11 same as DALL; KEEN, 1937, p. 46; BURCH, 1945, no. 54, p. 48; no. 55, p. 9; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196

*Turritella (Mesalia) lacteola* Carpenter, WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 1892, p. 205

"May be a local var. of the circumpolar *lacteola*, with altered sculpture: distinct, *teste* Cum-  
ing." [Carpenter, 1864b, p. 655]

The measurements as given by Oldroyd in her copy (1927) of Carpenter's description (1856) should be corrected as follows:

Read .33 for 33; read .24 for 24; read .14 for 14.

The following lines should be added:

". . . div. 30°.

"*Hab.*—In sinu Pugetiano ligit *Kennerley*. In insula Vancouver legit *Forbes*.

"*Anne* 'M. lactelae' varietas insignis, sculpturae indole satis discrepans." [Carpenter, 1865e, p. 62]

The holotype of this species is in the United States National Museum. Dall did not state that the illustration which he included (1921) was of the type. The dimensions are the same, but the drawing presents a different aspect than that of the actual specimen or a photograph of the same. Dall's drawing has an additional row of spiral ribs, and the nodes appear less sharp than they are. The specimen has intervening fine spiral threads not shown on Dall's drawing or on the photograph of the holotype herein included.

The Dall drawing has an aspect of whorl shape as in the type species of the genus, *T. reticulatum* (Adams) (Clench and Turner, 1950, pl. 40, figs. 14-15), more than has the actual type of the Carpenter species.

The holotype has a label, "type Puget Sd. Dr. Kennerly [*sic*]."

*Holotype*.—U. S. National Museum, no. 4195

*Distribution*.—Puget Sound, Washington (type); Chignik Bay, Alaska Peninsula, east and south to Point Abreojos, Lower California (Dall)

#### *Tachyrhynchus lacteolum subplanatum* (Carpenter)

(Pl. 20, fig. 6)

*Mesalia subplanata* CARPENTER, 1864b, p. 603, 655; Reprint, 1872, p. 89, 141; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 62

*Mesalia lacteola* var. ? *subplanata* Carpenter, COOPER, 1867, Geog. Cat. West Coast Moll., Geol. Sur. California, p. 28.

*Tachyrhynchus subplanata* (Carpenter), SMITH, 1915, Ann. Mag. Nat. Hist., ser. 8, vol. XV, p. 377

*Tachyrhynchus lacteolus subplanatus* (Carpenter), DALL, 1921, p. 152; OLDROYD, 1927, vol. II, pt. III, p. 58; GRANT AND GALE, 1931, p. 776; KEEN, 1937, p. 46; BURCH, 1945, no. 54, p. 48

"Sculpture fainter: whirls flattened." [Carpenter, 1864b, p. 655]

Oldroyd (1927) included a copy of Carpenter's description (1865). The following lines should be added to make that copy complete:

"*Hab.*—In sinu Pugetiano specimina viventia sed maxime erosa legit *Kennerley*: juxta "Neeah Bay" legerunt Indianuli, Swannii discipuli." [Carpenter, 1865e, p. 62]

There is a plication on the labium of the holotype. The specimen is worn, but some of the epidermis remains. There is a strong intervening thread between the spiral ribs.

*Holotype*.—U. S. National Museum, no. 4195b

*Distribution*.—Recent. Puget Sound, Washington (type); Puget Sound, Washington, to San Diego, California (Dall). Pleistocene. Mexico (Jordan, 1926)

#### Family VERMETIDAE

##### Genus *Petalococonchus* H. C. Lea, 1843

*Petalococonchus* H. C. LEA, 1843, Amer. Philos. Soc., Proc., vol. III, p. 162

Type species by monotypy *P. sculpturatus* LEA; Upper Miocene. Virginia, Carolinas and Florida. Antilles. MANSFIELD, 1930, Florida Geol. Sur. Bull. no. 3, pl. 14, fig. 10

*Petalococonchus macrophragma* Carpenter

*Petalococonchus macrophragma* CARPENTER, 1856, Zool. Soc. London, Proc., pt. XXIV, p. 313, fig. 1 of section only; 1857, Mazatlan Cat., p. 309; TRYON, 1886, Man. Conch., vol. VIII, p. 173, pl. 48; fig. 16; DALL, 1921, p. 151; BURCH, 1945, no. 54, p. 44

This species was described from Mazatlan by Carpenter. The figuring of the type belongs with illustration of the Mazatlan Catalogue. The holotype should be in the British Museum. The synonymy is not intended to be complete. The species ranges from Panama to Catalina Island (Burch).

The holotype is in the U. S. National Museum. It has a label, "Bivonia compacta type Vancouver Id. J. G. Swan." The photograph of the holotype was furnished by the authorities of the Smithsonian Institution.

*Holotype*.—U. S. National Museum, no. 13580

*Distribution*.—Barclay Sound, Vancouver Island, British Columbia (type); Vancouver Island, British Columbia, to San Pedro, California (Dall)

Genus *Aletes* Carpenter, 1857

*Aletes* CARPENTER, 1857, Zool. Soc. London, Proc. 1856, pt. XXIV, Jan., p. 226; 1857, Cat. Mazatlan Moll., after June<sup>79</sup>, p. 301

Type species by monotypy, *A. squamigerus* CARPENTER, Zool. Soc. London 1856, pt. XXIV, p. 226. Recent. Forrester Isl., Alaska, to Payta, Peru, and the Galapagos Islands (Burch).

*Aletes* Rafinesque, 1815, is a *nomen nudum*. Keen (1951, p. 8-15) presented the problem of *Scolivardion* Renier, 1807,<sup>80</sup> vs. *Serpulorbis* Sassi, 1827. She suggested (Jan. 18, 1951, personal communication) that she might regard *Aletes* as a subgenus of *Serpulorbis*.

*Petalococonchus compactus* (Carpenter)

(Pl. 20, fig. 15)

*Bivonia compacta* CARPENTER, 1864b, Aug., p. 628, 654; Reprint, 1872, p. 114, 140; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 427; Reprint, 1872, p. 239; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 27; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 204; DALL, 1921, p. 150; OLDROYD, 1924, Publ. Puget Sound Biol. Station, vol. 4, p. 147; 1927, vol. 11, pt. III, p. 48; KEEN, 1937, p. 31; BURCH, 1945, no. 54, p. 42; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196  
*Vermetus compacta* (Carpenter), TRYON, 1886, Man. Conch., vol. VIII, p. 177 list only  
*Dofania compacta* (Carpenter), KEEN in BURCH, 1947, no. 67, p. 25

"Frequent on *Pachypoma*; externally resembles *Petalococonchus macrophragma*." [Carpenter, 1864b, p. 628]

"Entirely open within: but colour and growth like . . . *Petalococonchus macrophragma*, Cpr. Maz. Cat. no. 359. From Southern fauna." [Carpenter, 1864, p. 654]

The measurements as given in Oldroyd's copy (1927) of Carpenter's description (1865) should be corrected as follows:

Read .7 for 7; read .3 for 3; read .1 for 1; delete "poll."

The following lines should be added:

"*Hab.* Barclay Sound, abundant on *Pachypoma gibberosum* (Swan).

"Belongs to *Bivonia*, Gray (not Mörch). Has the aspect of *Petalococonchus macrophragma* on a large scale, but is entirely destitute of internal laminae. One specimen had a faint columellar thread for two whirls only. Operculum normal, with thin edge, dark red." [Carpenter, 1864d, p. 427]

A specimen from the Carpenter Collection in the Redpath Museum" collected by the Indian children" for J. G. Swan at Neah Bay and Vancouver Island, was sent to Myra Keen for examination. She vouched that it was the same form as the holotype and furnished the following remarks (1951, personal communication) concerning the topotype (Redpath Museum, no. 936):

<sup>79</sup> See Iredale, (1916a, p. 36) on dates of Mazatlan Catalogue. The dates on individual pages for Mazatlan Catalogue are not true dates of publication.

<sup>80</sup> See also Bull. Zool. Nomen., vol. 9, pt. 9, 1954, p. 257-262 and Opinion 316, Op. and Declar. Int. Com. Zool. Nomen., vol. 9, pt. 5, p. 91-106, *Tavola* and *Prospetto* of Renier rejected for nomenclatorial purposes.

"As to the vermetid—it is, I think, as much *Petalocochnus* as anything. One broken specimen shows faint columellar threads. I find we have about a dozen specimens of what is probably this species. Ours, however, are not solitary. They all show the faint columellar thread and the same manner of coiling which is characteristic of the genus. I wish I could find an operculum, as that would clinch the matter. Our specimens had been identified, presumably by Dr. Dall, as *P. complicatus*. They are not the *P. complicatus* we have from southern California, which has very heavy internal laminae, but that is another problem. This specimen of yours confirms a suspicion that has been growing on me that the name *Bivonia* is unnecessary anyway and need not be replaced. I am beginning to feel certain that we shall have to redefine *Petalocochnus* to include species with obsolete laminae, for I have found specimens with *Petalocochnus* opercula and nuclear whorls which had no laminae, but I shall have to do much more comparative work before I am positive."

#### *Aletes squamigerus* Carpenter

*Aletes squamigerus* CARPENTER, 1856, Zool. Soc. London, Proc., p. 226; 1857, Rept. British Assoc. Adv. Sci. for 1856, p. 200, 233, 324, 349; 1857, Cat. Mazatlan Shells, p. 303, 304; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 4; DALL, 1921, p. 151; OLDROYD, 1927, vol. II, pt. III, p. 49; GRANT AND GALE, 1931, p. 777; KEEN, 1937, p. 29; WENZ, 1939, Hand. Paleozool., Bd. 6, Teil 3, p. 675, fig. 1928 copy Tryon, fig. 73; BURCH, 1945, no. 54, p. 43; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196; ABBOTT, 1954, p. 144, pl. 20, fig. e

*Thylacodes squamigera* (Carpenter), MÖRCH, 1862, Zool. Soc. London, Proc., p. 76 identical with var. *pennata*; CARPENTER, 1864b, p. 557; Reprint, 1872, p. 43

*Vermetus* (*Thylacodes*) *squamigerus* (Carpenter), TRYON, 1886, Man. Conch., vol. VIII, p. 181, pl. 54, figs 73, 74

*Serpulorbis squamigerus* CARPENTER, 1864b, p. 557, 654; Reprint, 1872, p. 43, 140; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 27; KEEP, 1887, West Coast Shells, p. 74; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 264; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15 no. 898, p. 204; ARNOLD, 1903, p. 299

The following lines should be added to Oldroyd's (1927) copy of Carpenter's original description:

"*Hab.* Sta. Barbara. Sp. magn. glomer. in Mus. Nuttall; San Diego, Mus. Gould.

"A fine group of this shell is in Mr. Nuttall's collection. It agrees in the main with the Mazatlan species, but differs in colour and sculpture. Mr. Nuttall believes that he found another species without scales." [Carpenter, 1856, p. 226]

"*Serpulorbis squamigerus*, Cpr. P.Z.S. 1856, p. 226 (not *Aletes*). Large, scaly, *Verm. anellum*, Mörch, P.Z.S. 1861, p. 359, is perhaps the young." [Carpenter, 1864b, p. 654]

The type is not in the British Museum (G. L. Wilkins, Oct. 17, 1950, personal communication).

*Type*.—Not found

*Distribution*.—Recent. Santa Barbara, California (type). Monterey, California, to Payta, Peru, and the Galapagos Islands (Dall). Pleistocene. California (Cooper; Arnold; Chace, 1919; Oldroyd, 1925; Stephens, 1929; Grant and Gale; Willett, 1937). Mexico (Jordan, 1926; Hertlein, 1934)

*Note*.—"Vermetus *lituella* Cpr." in Berry, 1907, Nautilus, vol. 21, p. 43. The "Cpr." is an error for Mörch.

#### Family CAECIDAE

##### Genus *Caecum* Fleming, 1813

*Caecum* FLEMING, 1813, Brewster's Edinburgh Encyclopaedia, vol. VII, p. 67 *vide* Neave (1939-40) and Sherborn (1937); 1815, American ed., vol. 6, pt. 2, p. 689

Type species by subsequent designation, GRAY, 1847, Zoöl. Soc. London, Proc., pt. XV, p. 203, *Dentalium trachea* MONTAGU, 1803, Testacea Britannica, pt. 2, p. 497, pl. 14, fig. 10. Living. European seas. HARMER, 1923, Palaeont. Soc., vol. LXXV, p. 847, pl. LXIV, fig. 32

##### *Caecum californicum* Dall

(Pl. 20, figs. 8, 9)

*Caecum Cooperi* CARPENTER, 1864, p. 612, 655; Reprint, p. 98, 141; 1866, California Acad. Sci., Proc., vol. III, p. 216; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28

Not *Caecum cooperi* S. SMITH, 1862, Ann. Lyc. Nat. Hist., New York, p. 154, 168

*Caecum californicum* DALL, 1885, U. S. Nat. Mus., Proc., vol. 8, p. 541 in ORCUTT, new name for *C. cooperi* Carpenter not Smith; TRYON, 1886, Man. Conch., vol. VIII, p. 219, pl. 66, fig. 65; KEEP, 1887, West Coast Shells, p. 73; DALL, 1892, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. III, p. 299; ARNOLD, 1903, p. 297, pl. 8, fig. 6; DALL, 1921, p. 149; OLDROYD, 1927, vol. II, pt. III, p. 44; GRANT AND GALE, 1931, p. 779; BAILY, 1935, West Coast Shells KEEP, p. 190, fig. 167; KEEN, 1937, p. 32; BURCH, 1945, no. 54, p. 38-40; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prop. Paper 207, p. 69; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196; ABBOTT, 1954, p. 147, fig. 37g.

"Small, with 30-40 sharp narrow rings." [Carpenter, 1864b, p. 655]

"*C. (Anellum) t. parva*, satis tereti, alba; annulis crebris acutioribus, angustis, circ. XXXIV-XXXVIII., interstitiis subconcavis; septo subungulato; apice obtuso, haud elevato, margine laterali recto; apertura declivi, parum contracto et postice expanso; operculo?"

"Long. 0.09, lat. 0.025.

"*Hab.* San Diego and Catalina Island, 8-10 fms. 18, *Cooper*."

"Known from similar Mazatlan species by the very numerous but separated and somewhat sharp ribs." [Carpenter, 1866a, p. 216]

The syntypes consist of two specimens on the original Carpenter glass mounts with a Carpenter label, "S. Diego Cooper." The specimens are well preserved and measure 2 mm. and 1.75 mm. in length, respectively.

*Syntypes*.—U. S. National Museum, no. 15719 (*C. cooperi* Carpenter)

*Distribution*.—Recent. San Diego, California (type); Monterey, California to Lower California (Dall). Pleistocene. California (Arnold; Oldroyd, 1925; Grant and Gale; Woodring, Bramlette, and Kew) Mexico (Jordan, 1926)

#### Caecum quadratum Carpenter

*Caecum quadratum* Carpenter, BERRY, 1907, Nautilus, vol. 21, no. 1, p. 43 Monterey

Smith and Gordon (1948) doubt the identification of this species in the upper California fauna. It is not recorded by other authors from that region. The species was described from Mazatlan by Carpenter (1857, p. 322).

#### Genus Micranellum Bartsch, 1920

*Micranellum* BARTSCH, 1920, Washington Acad. Sci., Jour., vol. X, p. 568

Type species by original designation, *Caecum crebricinctum* CARPENTER, 1864b, p. 655; 1866, California Acad. Sci., Proc., vol. III, p. 215. Living. Monterey, California, to Lower California, in shallow water. (Pl. 20, figs. 10, 11, 11A)

*C. alterum* Meyer of the Jackson Eocene, southern United States appears to be a typical *Micranellum*. This would lower the range of the genus as given by authorities (Wenz, 1939, p. 683). Miocene-Recent.

*Micranellum* was proposed by Bartsch as a genus of the Caecidae. Theile (1931, p. 188) and Wenz (1939, p. 683) limit the group to sectional subgeneric rank respectively.

#### Micranellum crebricinctum (Carpenter)

(Pl. 20, figs. 10, 11, 11A)

*Caecum crebricinctum* CARPENTER, 1864b, p. 612, 655; Reprint, 1872, p. 98, 141; 1866, California Acad. Sci., vol. III, p. 215; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28; Cooper, 1870, Amer. Jour. Conch., vol. VI, p. 63; TRYON, 1886, vol. VIII, p. 218, pl. 67, figs. 71; KEEP, 1887, West Coast Shells, p. 73; DALL, 1892, Wagner Free Inst. Sci. Philadelphia, Trans., vol. III, pt. I, p. 300. ARNOLD, 1903, p. 298, pl. VIII, fig. 10

*Caecum magnum* "Stearns" TRYON, 1886, Man. Conch., vol. VIII, p. 219, pl. 67, fig. 83 *vide* DALL, 1892; ARNOLD, 1903, p. 298, pl. VIII, fig. 16 young *vide* WILLET, 1937, San Diego Soc. Nat. Hist. Trans., vol. VIII, no. 30, p. 399

*Micranellum crebricinctum* (Carpenter), BARTSCH, 1920, Washington Acad. Sci., Jour., vol. X, p. 568; DALL, 1921, p. 149; OLDROYD, 1927, vol. II, pt. III, p. 45; GRANT AND GALE, 1931, p. 779; BAILEY, 1935, West Coast Shells (KEEP), p. 190; KEEN, 1937, p. 40; BURCH, 1945, no. 54, p. 38, 40, 41; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Papers 207, p. 69; SMITH AND GORDON, 1948, California Acad. Sci. Proc., ser. 4, vol. XXVI, p. 196

*Caecum (Micranellum) crebricinctum* CARPENTER, ABBOTT, 1954, p. 147, fig. 37 m

"Large, with aspect of *Elephantulum*, but very fine close annular sculpture; plug sub-angulate. 8-20 fm. *Cp.*" [Carpenter, 1864b, p. 655]

Oldroyd (1927) republished Carpenter's description (1866). To her copy the following lines should be added:

"State Collection, no. 388."

"*Hab.* San Diego, 8-10 fms., 12; Monterey, 20 fms., 20, some alive; Santa Barbara, 20 fms., 3 *Cooper.*

"Has the aspect, but not the sculpture, of an *Elephantulum.*" [Carpenter, 1866a, p. 216]

The syntypes (two specimens) in the U. S. National Museum are on an original Carpenter glass mount with an original label "State Coll. 388".

*Syntypes.*—U. S. National Museum, no. 14930

*Distribution.*—Recent. San Diego, California (type); Forrester Island, Alaska, south to San Martin Island, Lower California (Baker). Pleistocene. California (Arnold; Oldroyd, 1925; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew); Mexico (Dall, 1892; Jordan, 1926)

#### Family POTAMIDIDAE

#### Genus *Cerithidea* Swainson, 1840

*Cerithidea* SWAINSON, 1840, Treatise of Malacology, p. 198, 203, 342; BEQUAERT, 1942, *Johnsonia*, no. 5, p. 1; *Nautilus*, 1942, vol. 56, no. 1, p. 20

Type species by subsequent designation, PILSBRY AND HARBISON, 1933, *Acad. Nat. Sci. Philadelphia*, Proc., vol. 85, p. 115 *C. obtusa* LAMARCK, 1822, *Hist. Nat. An. sans Vert.*, vol. 7, p. 71 = *C. lineolata* GRIFFITH AND PIDGEON, 1834, CUVIER, *Animal Kingdom*, Mollusca, pl. 14, fig. 4 as *Melania* = *C. truncatum* GRIFFITH AND PIDGEON, CUVIER, *Animal Kingdom*, Mollusca, p. 596. Recent. Indo-Malayan

#### *Cerithidea hegewischii albonodosa* Carpenter

(Pl. 20, fig. 19)

*Cerithidea albonodosa* CARPENTER, in GOULD AND CARPENTER, 1856, *Zool. Soc. London*, Proc., p. 205; Carpenter, 1857, Rept. British Assoc. Adv. Sci. 1856, p. 228, 283, 325, 351; 1860, *Smith. Misc. Coll.*, vol. 2, art. 6, p. 4; 1864b, p. 667; Reprint, 1872, p. 153 var. *mazatlanica*; 1863, *Zool. Soc. London*, Proc., p. 350; Reprint, 1872, p. 186; REEVE, 1866, *Conch. Icon.*, vol. 15, *Cerithidea*, pl. 1, figs. 1a-b

*Cerithidea hegewischii albonodosa* Carpenter, BERQUAERT, 1942, *Nautilus*, vol. 56, no. 1, p. 25; SMITH, M., 1944, *Panamic Marine Shells*, p. 18; DURHAM, 1950, *Geol. Soc. Amer.*, Mem. 43, p. 120, pl. 33, fig. 19

"*C. t. solida*, *C. varicosae* simili, compacta, fusco-purpurea, varicibus et nodulis albis, fasciis spiralibus intensioribus saepe ornata; anfr. XII parum convexis, sutura impressa; liris spiralibus IV. in anfr. penult. et liris creberrimis transversis vix undatis, ad intersectiones nodosis, ornata; varicibus iii, in anfr. ii, apertura, subquadrata, sinu minimo, labio haud expanso; operculo subplanato, nucleo mucronato, anfr. plurimis indistinctis, fusco, ad marginem tenuissimum diaphano.

"Long. .8, long. spir. .57, lat. .33, div. 20°.

"*Hab.* San Diego; legit. *Dr. Webb*. Mus. Gould.

"Known from *C. varicosae* var. *Mazatlanica*, by the light purplish brown tinge, the colour of which wears off at the varices and nodules, and by the details of sculpture." [Carpenter in Gould and Carpenter, 1856, p. 205]

G. L. Wilkins (British Museum) kindly furnished the following (Personal communication):

"We do not appear to have the specimen figured by Reeve, which is larger than that selected by Carpenter as the type on pp. 205-6, P.Z.S. 1856 but there is one that approximates to it (17 mm. in length). The label fits very well and runs *C. albonodosa* Carp. San Diego Dr. Webb and is from the Cuming Collection. If this does not prove to be the type it is probably a reliable paratype and may have been sent to Cuming by Gould."

The authorities of the British Museum have coöperatively furnished a photograph of the specimen mentioned. The writer selects the specimen as the lectotype of this species. No other authentic type material has been found.

*Lectotype.*—British Museum (Natural History), Department of Zoology, no. 1950.11.9.2.

*Distribution.*—Recent San Diego, California (type); San Diego, California, Magdalena

Bay, and Espiritu Santo Island, Lower California (Bequaert). See Table 2 for stratigraphic distribution.

Family CERITHIIDAE

Genus *Bittium* Leach in Gray, 1847

*Bittium* LEACH in GRAY, 1847, Ann. Mag. Nat. Hist., vol. XX, p. 270

Type species by subsequent designation, GRAY, 1847, Zool. Soc. London, Proc., pt. XV, p. 154; *Murex reticulatus* MONTAGU, 1803, Testacea Britannica, p. 272 = *B. reticulatum* (DA COSTA), 1778, British Conch., p. 117, pl. 8, fig. 13. Living. Europe. HARMER, 1918, Palaeont. Soc., 1916, LXX, p. 414, pl. XLI, figs. 1-3

Subgenus *Semibittium* Cossmann, 1896

*Semibittium* COSSMANN, 1896, Cat. Illus. Coq. Fos. Env. Paris, app. 2, Soc. Roy. Malacol. Belgique, vol. XXXI, p. 29

Type species by subsequent designation, COSSMANN, 1906, Essais Paleococonch. Comp., vol. 7, p. 138; *Cerithium cancellatum* LAMARCK, 1804, Ann. du Mus. d'Hist. Nat., t. 3, p. 437; Lutetian Eocene. France. DESHAYES, 1837, Desc. Coq. Fos. Env. Paris, t. II, Atlas, pl. LIII, figs. 26-29; COSSMANN, 1896, Cat. Illus. Coq. Fos. Env. Paris, app. 2, pl. IX, figs. 7-8

*Bittium* (*Semibittium*) *armillatum* (Carpenter)

(Pl. 22, fig. 10)

*Bittium armillatum* CARPENTER, 1864b, p. 539, 613, 655; Reprint, 1872, p. 25, 99, 141; 1866, Ann. Mag. Nat. Hist., ser. 3, vol. XVII, p. 276; Reprint, 1872, p. 323; ? COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28; ? COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 63 SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 195 doubt the record; TRYON, 1887, Man. Conch., vol. IX, p. 158 list only

*Bittium* (*Semibittium*) *armillatum* (Carpenter), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, p. 391, pl. 52, fig. 6 type; DALL, 1921, p. 146; VAN WINKLE [Palmer], 1921, Bull. Amer. Paleont., vol. VIII, no. 36, p. 4; OLDROYD, 1927, vol. II, pt. III, p. 25, pl. 76, fig. 6 type same as BARTSCH, 1911; GRANT AND GALE, 1931, p. 762; KEEN, 1937, p. 30; BURCH, 1945, no. 54, p. 28, 31; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 68; pl. 34, fig. 6 includes *B. purpurcum*; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 195 doubt Cooper's record of Monterey see above.

"Same aspect [*asperum*]: 3 nearly equal rows of knobs." [Carpenter, 1864b, p. 655]

Oldroyd (1927) republished Carpenter's description (1866). The following should be changed in that copy:

Page 26, 3d line, last word, delete last "ta."

Add:

"*Hab.* S. Barbara, Pleistocene, 1 sp. (*Jewett*). S. Pedro, S. Diego (*Cooper*).

"The sculpture resembles *Cerithiopsis*; but the columella is pinched, not notched." [Carpenter, 1866b, p. 276]

Bartsch enumerated the details of the shell characters of this species and figured a syntype. The label of that syntype is as follows: "Pleistocene Sta. B. Jewett." Oldroyd included Bartsch's notes in her work. There is a well-preserved syntype in the Redpath Museum labelled, "type fossil. Sta. Barbara". A photograph of that specimen is included herein.

Woodring (*in* Woodring, Bramlette, and Kew) suggested that *B. purpurcum* is a living form of *B. armillatum*, and that *B. armillatum* does not occur in the Recent.

*Dimensions*.—Length 9.5 mm.; diameter 3.2 mm. (syntype) (Bartsch); length 11 mm.; greatest diameter 3 mm. (syntype, Redpath Museum.)

*Syntypes*.—U. S. National Museum, no. 15653; Redpath Museum, no. 4851

*Distribution*.—Pleistocene. Santa Barbara, California (type) ["two miles from the coast and 150 feet high."]; (Bartsch; Grant and Gale; Woodring, Bramlette, and Kew). Recent. Santa Barbara and San Pedro, California, south to San Martin, Lower California (Baker; Burch).

*Bittium* (*Semibittium*) *attenuatum* Carpenter

*Bittium attenuatum* CARPENTER, 1864b, p. 655; Reprint, 1872, p. 141; 1865, Jour. de Conchyliol., vol. XIII, p. 142, Reprint, 1872, p. 310; COOPER, 1867, Geog. Cat. Moll., Geol. Sur.

California, p. 28; 1870, Amer. Jour. Conch., vol. VI, p. 63; TRYON, 1887, Man. Conch., vol. IX, p. 153, pl. 30, fig. 8

*Bittium quadrifilatum* Carpenter, ARNOLD, 1903, p. 293 in part, pl. IX, fig. 2

*Bittium (Semibittium) attenuatum* (Carpenter), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, no. 1826, p. 393, pl. 54, figs. 1, 2, 5 types; DALL, 1921, p. 146; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 141; 1927, vol. II, pt. III, p. 21, pl. 78, figs. 1, 2, 5 same as BARTSCH, 1911; GRANT AND GALE, 1931, p. 762; BAILY, 1935, West Coast Shells, (KEEP), p. 193; KEEN, 1937, p. 30; BURCH, 1945, no. 54, p. 23, 30; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 67, 68; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 195

*Bittium filosum* ? var. *esuriens* CARPENTER, 1864b, p. 537, 628, 655; Reprint, 1872, p. 23, 114, 141; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 181; Reprint, 1872, p. 283; 1865, Jour. de Conchyl. vol. 13, p. 142; Reprint, 1872, p. 310; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28 TRYON, 1887, Man. Conch., vol. IX, p. 153, pl. 30, fig. 16

*Bittium (Stylidium) attenuatum* Carpenter, ABBOTT, 1954, p. 156

"Like starved *filosum*, very narrow, adult scarcely sculptured." [*B. var. esuriens*, Carpenter, 1864b, p. 655]

"Like *plicatum*, A. Ad., or drawn-out *esuriens*, with threads instead of grooves." [Carpenter, 1864b, p. 655, *B. attenuatum*]

Oldroyd (1927) republished Carpenter's description (1865g) of *B. attenuatum*. Correct her copy as follows:

Last line, read .31 for 31; read .11 for 11.

Add:

" . . . div. 18°.

"Hab. Monterey, Taylor.—Neeah Bay, Swan.

"Je n'ai vu qu'un seul échantillon en bon état de cette espèce. Elle a la taille du *B. plicatum*, A. Ad., mais la sculpture de la base est différente. [Carpenter, 1865g, p. 143, *B. attenuatum*]

"B. t. '*B. filoso*' simili, sed multo minore, graciliore, interdum valde attenuata; sculptura t. juniore ut in '*B. filoso*'. sed t. adulta subobsoleta; interstitiis haud insculptis. Long. .27, long. spir. .19, lat. .085, poll.: div. 25°

"Hab. Neeah Bay, Swan Sta. Barbara, Jewett.—Monterey, San Pedro, Cooper.

"Bien que j'ai vu beaucoup d'individus de cette forme, et un plus grand nombre encore du *B. filosum*, Gld. (= *Turritella Eschrichti*, Midd. = *Acirsa Eschrichti*, Adams, *Genera*), je ne puis décider avec une certitude complète si c'est une véritable espèce, ou seulement une variété dégradée et, pour ainsi dire, affamée (*esuriens*) du *B. filosum*, qui d'ailleurs, ne varie pas. Comme le *B. filosum*, qui, d'ailleurs, ne s'étend pas aussi loin au sud, il est probable que les échantillons californiens doivent être considérés comme distincts, tandis que les individus de la région Vancouverienne peuvent être réunis au *B. filosum*. Tous les individus qu'on a envoyés étaient très—roulés." [Carpenter, 1865g, p. 142, *B. (? var.) esuriens*]

Bartsch presented a detailed description and figured the syntypes of *B. attenuatum*, as well as the holotype of *B. esuriens* Carpenter, which he regarded as a young individual of *B. attenuatum*. This opinion appears reasonable from the illustrations. The writer includes original descriptions for completeness.

*Dimensions*.—Length 10.2 mm., 8.8 mm.; diameter 3 mm., 2.9 mm. respectively (syntypes, *B. attenuatum*).

*Type*s.—U. S. National Museum, syntypes, *B. attenuatum*, no. 15584; holotype, *B. esuriens*, no. 14832. Lectotype, no. 15584 (Bartsch, 1911, pl. 54, fig. 5; selected by Woodring in Woodring, Bramlette, and Kew, 1946, p. 68)

*Distribution*.—Recent. Monterey, California; Neah Bay, Washington (type localities). The syntypes from different localities have been deposited together without locality differentiation. Therefore, even if one of the two specimens were chosen as lectotype, the proper locality cannot be attached. Forrester Island, Alaska, to San Diego, California (Dall). Pleistocene. California (Bartsch, Oldroyd, 1925; Grant and Gale; Woodring, Bramlette, and Kew)

#### *Bittium (Semibittium) purpureum* (Carpenter)

*Cerithiopsis purpurea* CARPENTER, 1864, p. 537, 660; Reprint, 1872, p. 23, 146; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 397; Reprint, 1872, p. 287; TRYON, 1887, Man. Conch., vol. IX, p. 171, pl. 35, fig. 43; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 210

*Rissoina purpurca* CARPENTER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 65

*Bittium (Semibittium) purpurcum* (Carpenter), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, p. 391, pl. 52, figs. 1, 3 syntype; DALL, 1921, p. 146; OLDROYD, 1927, vol. II, pt. III, p. 26, pl. 76, figs. 1, 3 syntype same as BARTSCH, 1911; BAILY, 1935, West Coast Shells, (KEEP), p. 193, KEEN, 1937, p. 31; BURCH, 1945, no. 54, p. 28, 31; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 68; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 195

"Stained with purple: nodules fine: base finely lirated." [Carpenter, 1864b, p. 660]

Oldroyd (1927) published a copy of Carpenter's description (1865). The measurements given by her should be corrected to read, "Long. .29, long. spir. .19, lat. .1, div. 20°."

The following line should be added to make the copy complete:

"*Hab.* Sta. Barbara (*Jewett*); Monterey, San Diego (*Cooper*)."  
[Carpenter, 1865i, p. 397]

Bartsch analyzed the characters of the species and distribution and included a figure of one of the four syntypes. Those specimens have the label "Monterey Sta. B." It is, therefore, impossible to select the type locality from the specimens.

*Dimensions*.—Length 7.3 mm.; diameter 2.5 mm. (syntype) (Bartsch)

*Syntypes*.—U. S. National Museum, no. 14823

*Distribution*.—Monterey and Santa Barbara, California (types); Monterey to San Diego, California (Dall)

#### *Bittium (Semibittium) quadrifilatum* (Carpenter)

*Bittium quadrifilatum* CARPENTER, 1864b, p. 655; Reprint, 1872, p. 141

? *Bittium quadrifilatum* CARPENTER, 1865, Jour. de Conchyliol., vol. XIII, p. 143; Reprint, 1872, p. 311; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28; 1870, Amer. Jour. Conch., vol. VI, p. 63; TRYON, 1887, Man. Conch., vol. IX, p. 153, not pl. 29, fig. 91; KEEP, 1887, West Coast Shells, p. 72; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 205, pl. XXI, fig. 4; ? ARNOLD, 1903, p. 292-294 in part, pl. IX, fig. 2 = *B. attenuatum*

*Bittium (Semibittium) quadrifilatum* (Carpenter), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, p. 398, pl. 58, figs. 2 (type), 3; DALL, 1921, p. 146; OLDROYD, 1927, vol. III, pt. II, p. 24, pl. 73, fig. 4 same as WILLIAMSON, 1892, pl. 79, figs. 2 type, 3 same as BARTSCH, 1911; GRANT AND GALE, 1931, p. 762; BAILY, 1935, West Coast Shells, p. 193, fig. 171 after BARTSCH; KEEN, 1937, p. 31; BURCH, 1945, no. 54, p. 29, 31; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 67 not Pleistocene; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 196

*Bittium (Stylidium) quadrifilatum* Carpenter, ABBOTT, 1954, p. 156

"Broad: 4 threads, equal from beginning, coiling over strong radiating ribs." [Carpenter, 1865g, p. 143]

Oldroyd (1927) republished Carpenter's description (1865) of this species. There are many typographical errors in her copy; the following corrections should be inserted:

Line 2, insert question before "sinistrali"; line 3, delete the comma after "normalibus" and insert "7"; line 4, correct 15 to 16; line 6, read "angustis" for "sagustis"; line 8, read "labio parvo" for "libio parvulo"; line 9, read .26 for 26, .18 for 16, .09 for 9; add div. 25°."

The following lines should be added to make the copy complete:

"*Hab.* S. Pedro, *Cooper*.—S. Diego, *Cassidy*."

"Dans cette espèce et dans quelques autres très voisines, les *B. asperum* et *B. armillatum*, par exemple, le nucléus, est très—différent de celui des *Bittium* typiques. Il est probable qu'elles n'appartiennent pas au même genre." [Carpenter, 1865g, p. 143]

Bartsch discussed this species and illustrated the holotype. That specimen according to the label was collected by Cooper at San Diego. This does not coincide with Carpenter's statement that the San Diego specimens were collected by Cassidy and that Cooper's specimen came from San Pedro. Therefore, one cannot tell whether the locality or the collector on the label is incorrect or whether the confusion was made by Carpenter in his description.

*Dimensions*.—Length 7 mm.; diameter 3 mm. (holotype); length 11.5 mm.; diameter 3.6 mm. (from Bartsch; specimen figured by Bartsch).

*Holotype*.—U. S. National Museum, no. 14849 (14935)



*Distribution*.—Recent, San Diego, California (type); Monterey, California to San Ignacio Lagoon, Lower California (Dall). Cooper (1888), Arnold, and Bartsch report the species from the Pleistocene (Arnold in Pliocene, *vide* Grant and Gale), but Woodring (Woodring, Bramlette, and Kew) limited the species to the Recent.

***Bittium (Semibittium) rugatum* Carpenter**

*Bittium rugatum* CARPENTER, 1864b, p. 539; Reprint, 1872, p. 25; 1866, Ann. Mag. Nat. Hist., ser. 3, vol. XVII, p. 276; Reprint, 1872, p. 323; ARNOLD, 1903, p. 295, pl. IV, fig. 11  
*Bittium (Semibittium) rugatum* (Carpenter), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, p. 397, pl. 56, figs. 4 type 5; DALL, 1921, p. 146; OLDROYD, 1927, vol. II, pt. III, p. 23; GRANT AND GALE, 1931, p. 762; KEEN, 1939, p. 31; BURCH, 1945, no. 54, p. 29, 31; WOODRING, BRAMLETTE AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 67, pl. 29, fig. 19  
*Bittium asperum* "Gabb," TRYON, 1887, Man. Conch., vol. IX, p. 153 in part, pl. 30, fig. 7 = *B. rugatum* copy from REEVE, 1865, Conch. Icon., vol. 15, *Cerithium*, pl. XIX., fig. 140.  
*Bittium asperum* CARPENTER, 1864, p. 613, 655, Reprint, 99, 141; 1865, Jour. de Conchyl., vol. XIII, p. 143; Reprint, p. 311; 1866, Ann. Mag. Nat. Hist., ser. 3, vol. XVII, p. 276; Reprint, 1872, p. 323; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 28; WILLIAMSON 1892, U. S. Nat. Mus., Proc. vol. 15, no. 898, p. 205 Cooper  
 Not *Bittium asperum* GABB, 1861, Acad. Nat. Sci., Proc., vol. 13, p. 368; ARNOLD, 1903, p. 291, in part

"Same aspect: [*B. quadrifilatum*] upper whirls with 2 strong and 2 faint keels over less prominent ribs. Bch.—40 fm. *Cp.*" [*B. asperum*, Carpenter, 1864b, p. 655]

"B. testa *B. quadrifilato* forma, magnitudine, et indole simili, sed sculptura intensiore; eodem vertice nucleoso abnormali; sed, vice florum, costulis spiralibus costas spirales superantibus, subnodulosis; t. jun. costulis ii, anticis majoribus, alteris minimis; postea plerumque IV subaequalibus, interdum iii. interdum aliis intercalantibus; sculptura basali intensiore; costis radiantibus subarcuatis. ? = *Turbonilla aspersa*, Gabb, in Proc., Acad. Nat. Sc. Philadelphia, 1861, p. 368.

"*Hab.* Sta. Barbara, fossil in Pleistocene beds; abundant (*Jewett*). S. Pedro, San Diego, Catalina Is. 30–40 fms. (*Cooper*), State Col. no. 591c.

"Mr. Gabb informs me that his *Turbonilla aspera* is a *Bittium*. Unfortunately the type is not accessible; and as the diagnosis would fit several closely allied species, it cannot be said with precision to which it rightfully applies. As this is the commonest of the group, it is presumed that it is the '*Turbonilla*' intended. Should the type, however, be recovered, and prove distinct, this shell should take the name of *B. rugatum*, under which I wrote the diagnosis, and which was unfortunately printed in the Brit. Assoc. Report, p. 539. The fossil specimens are in much better condition than the recent shells as yet discovered." [*B. ? asperum* Carpenter, 1866b, p. 276]

Bartsch published a detailed description and illustrations, including a figure of the holotype of this species.

*Measurements*.—Length 12 mm. (holotype); length 10.5 mm.; diameter 3.5 mm.; specimen figured by Bartsch.

*Holotype*.—U. S. National Museum, no. 7154

*Distribution*.—Pleistocene (lower): Santa Barbara formation, Santa Barbara, California (type "two miles from coast and 150 feet high," Carpenter, 1864b, p. 539; Arnold; Oldroyd, 1925; Bartsch; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew); Mexico, (Jordan, 1926). Recent, San Pedro and Catalina Island, California (Dall), to Todos Santos Bay, Lower California (Jordan)

Subgenus ***Lirobittium* Bartsch, 1911**

*Lirobittium* BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, no. 1826, p. 384

Type species by original designation, *B. (L.) catalinense* BARTSCH, 1907, Smith, Misc., Coll. (Quart.), vol. 50, pt. 4, p. 28, pl. 57, fig. 13; Recent and Pleistocene. California. BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, no. 1826, pl. 51, fig. 1

***Bittium (Lirobittium) interfossa* (Carpenter)**

*Rissoina interfossa* CARPENTER, 1864b, p. 613, 656; Reprint, 1872, p. 99, 142 not as *Rissoa* as stated by BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, no. 1826, p. 401 and OLDROYD, 1927; CARPENTER 1866, California Acad. Sci., Proc., vol. III, p. 217; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; 1870, Amer. Jour. Conch., vol. VI, p. 64; TRYON, 1887, Man. Conch., vol. IX, p. 392; KEEP, 1887, West Coast Shells, p. 65  
*Cerithiopsis fortior* CARPENTER, 1864b, p. 537, 660; Reprint, 1872, p. 23, 146; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 397; Reprint, 1872, p. 287; COOPER, 1867, Geog. Cat. Moll.,

Geol. Sur. California, p. 35; TRYON, 1887, *Man. Conch.*, vol. IX, p. 177 list only; ? WILLIAMSON, 1892, *U. S. Nat. Mus., Proc.*, vol. 15, no. 898, p. 210; BARTSCH, 1911, *U. S. Nat. Mus., Proc.*, vol. 40, no. 1826, p. 401 synonymous with *B. interfossa*; GRANT AND GALE, 1931, p. 760 under *B. interfossa*

*Bittium (Lirobittium) interfossa* (Carpenter), BARTSCH, 1911, *U. S. Nat. Mus., Proc.*, vol. 40, p. 401, pl. 51, figs. 2 (type), 6; DALL, 1921, p. 147; OLDROYD, 1927, vol. II, pt. III, p. 30, pl. 75, figs. 2 type, 6 same as BARTSCH, 1911; KEEN, 1937, p. 31; BURCH, 1945, no. 54, p. 28, 32; WOODRING, BRAMLETTE, AND KEW, 1946, *U. S. Geol. Sur., Prof. Paper* 207, p. 67, 68; SMITH AND GORDON, 1948, *California Acad. Sci., Proc.*, ser. 4, vol. XXVI, p. 195  
*Bittium (Lirobittium) interfossus* (Carpenter), GRANT AND GALE, 1931, p. 760; BAILY, 1937, *West Coast Shells*, (KEEP), p. 194; ABBOTT, 1954, p. 156

"With 5 sharp keels crossing 14 strong ribs. 8-10 fm." [Carpenter, 1864b, p. 656]

"R. t. satis magna, crossa, alba, satis turrita, conspicue sculpta; marginibus spirae rectis, vertice mamillato; anfr. nucl. ? . . . [detrītis]; norm. VII tumidis, angulatis, suturis angulatum impressis; carinis spiralibus validis, in spira ii.; altera postica interdum intercalante; anfr. ultimo dualbus quoque peripherialibus, quinta axim circumeunte; costis radiantibus validis, extantibus, circ. XIV., ad suturas contiguīs, liris regularibus spiram ascendentibus, ad intersectiones carinarum nodulosis, ad peripheriam continuis; interstitiis quadratis, alte infossatis; apertura ovata.

"Long. 0.26, long. spir. 0.18, lat. 0.10; div. 28°.

"*Hab.* Catalina Is. 8-10 fm. 4; San Diego 1; Monterey. (var.) *Cooper*." [Carpenter, 1866a, p. 217]

"Sculpture open; strong basal rib." [Carpenter, 1864b, p. 660, *C. fortior*]

"C. testa *C. purpureae* simili, sed sculptura multo fortiore, basi pallide; seriebus nodulorum spiralibus testa adolescente ii., postea iii.; costis radiantibus circ. xiii., interstitiis magnis; costis suturalibus validis, subnodosis; costa basali valida.

"Long. .3, long. spir. .2, lat. .11, div. 26°.

"*Hab.* Sta. Barbara, 1 specimen (*Jexvett*)." [Carpenter, 1865h, p. 397, *C. fortior*]

The type of *C. fortior* has not been found.

Bartsch discussed the shell characters in detail and illustrated the holotype and a more mature and less eroded specimen from the type locality. The holotype has the label "387a type Catalina Id. Cooper." This label coincides with Carpenter's description (1866) and verifies the authenticity of the type. Oldroyd reprinted Bartsch's discussion<sup>81</sup>

*Dimensions*.—Length 6.2 mm. (holotype); length 8.3 mm.; diameter 3.1 mm.; specimen figured by Bartsch

*Holotype*.—U. S. National Museum, no. 224860 [Early California State Geol. Sur., no. 387a]

*Distribution*.—Recent. Catalina Island, California (type); Monterey to San Diego, California (Dall). Pleistocene. Mexico (Jordan, 1926); California (Woodring, Bramlette and Kew)

#### *Bittium (Lirobittium) munitum* (Carpenter)

*Cerithiopsis munita* CARPENTER, 1864b, p. 628, 660; Reprint, 1872, p. 114, 146; 1865, *Ann. Mag. Nat. Hist.*, ser. 3, vol. XV, p. 32; COOPER, 1867, *Geog. Cat. Moll.*, *Geol. Sur. California*, p. 35; TRYON, 1887, *Man. Conch.*, vol. IX, p. 172, pl. 35, fig. 42; WILLIAMSON, 1892, *U. S. Nat. Mus., Proc.*, vol. 15, no. 898, p. 210

*Bittium (Lirobittium) munitum* (Carpenter), BARTSCH, 1911, *U. S. Nat. Mus., Proc.*, vol. 40, p. 404, pl. 53, figs. 1, 2, syntypes; DALL, 1921, p. 147; OLDROYD, 1924, *Pub. Puget Sound Biol. Station*, vol. 4, p. 144; 1927, vol. II, pt. III, p. 33; KEEN, 1937, p. 31; BURCH, 1945, no. 54, p. 28, 32; SMITH AND GORDON, 1948, *California Acad. Sci., Proc.*, ser. 4, vol. XXVI, p. 195

"Stout: strongly sculptured: base evenly ribbed." [Carpenter, 1864b, p. 660]

Oldroyd (1927) published a copy of Carpenter's description (1865). The measurements in her copy should be corrected as follows:

Read .34 for 34; read .24 for 24; read .11 for 11; delete "poll."

Add:

"div. 20°."

"*Hab.* Neeah Bay; common (*Swan*)." [Carpenter, 1865a, p. 32]

<sup>81</sup> The no. 56906 which Oldroyd gave as the type number is not that of the type but of the second specimen which Bartsch figured. (See Bartsch, p. 401, 402.)

Bartsch enumerated the shell characters and illustrated two of "ten" syntypes. At present in the U. S. National Museum there are 12 specimens in the lot which have a label, "type Neeah [sic] Bay Wash. Swan."

*Dimensions.*—Length 7.8 mm.; diameter 3 mm.; length 7 mm. (syntypes) (Bartsch)

*Syntypes.*—U. S. National Museum, no. 15501 a and b

*Distribution.*—Neah Bay, Washington (type); Forrester Island, Alaska, to Cambria Pines, California (Burch)

#### Family Alabinidae

#### Genus *Alabina* Dall, 1902

*Alabina* DALL, 1902, *Nautilus*, vol. 15, no. 11, p. 217 substitute for *Elachista* DALL AND SIMPSON, 1901, *Mollusca of Porto Rico*, U. S. Fish. Comm., Bull., vol. 20, pt. 1, p. 427

*Elachista* DALL AND BARTSCH, 1901, *Nautilus*, vol. 15, no. 5, p. 58; Not *Elachista* TREITSCHKE, 1933, see NEAVÉ (1939-1940) for reference

Type species by original designation, *Bittium cerithioides* DALL, 1889, *Mus. Com. Zool.*, Bull., XVIII, p. 258; 1892, *Wagner Free Inst. Sci.*, Philadelphia, Trans., vol. III, pt. II, p. 276, pl. 16, fig. 8. Recent. North Carolina to West Indies. Pliocene. Florida

As Woodring (1928, p. 338) pointed out, the name *Alabina* was supposed to be a substitute name, but a different type was chosen for it from that of the genus for which it replaced. It would seem that if the type species of *Alabina* is not congeneric with *Elachista*, the latter lacks a substitute name; or if *Alabina* is a substitute name, the type species of *Elachista* should become the type species of *Alabina*.

Dall (1923, p. 3) stated that *Alabina* Dall, 1902 = *Fenella* [*Finella*] A. Adams (1860, p. 336) not Westwood (1840, p. 54 see Neave 1939-1940).

#### *Alabina tenuisculpta* (Carpenter)

(Pl. 20, figs. 13, 14)

*Mesalia tenuisculpta* Carpenter, 1864b, p. 612, 655; Reprint, 1872, p. 98, 141; COOPER, 1867, *Geog. Cat. Moll.*, *Geol. Sur. California*, p. 28; KEEP, 1887, *West Coast Shells*, p. 73

? *Mesalia tenuisculpta* CARPENTER, 1866, *California Acad. Sci.*, Proc., vol. III, p. 216

*Alabina tenuisculpta* (Carpenter), BARTSCH, 1911, *U. S. Nat. Mus.*, Proc., vol. 39, no. 1790, p. 415, pl. 61, fig. 6; DALL, 1921, p. 145; OLDROYD, 1927, vol. II, pt. III, p. 14, pl. 96, fig. 6; BAILY, 1935, *West Coast Shells*, (KEEP), p. 193; KEEN, 1937, p. 29; BURCH, 1945, no. 54, p. 27; ABBOTT, 1954, p. 158

*Fenella tenuisculpta* (Carpenter), DALL, 1923, *U. S. Nat. Mus.*, vol. 63, p. 3 corrections to Bull. 112

"Very small, slender, whorls rounded, lip waved. Shoalwater. *Cp.*" [Carpenter, 1864b, p. 655]

Oldroyd (1927) republished Carpenter's description (1866). The following changes should be made in her copy.

"Delete "poll."

". . . State Collection no. 666a.

". . . div. 15°.

"*Hab.* S. Diego; 4-6 fms. 15, alive. *Cooper.*

"Intermediate in character between *Mesalia* and *Fenella*." [Carpenter, 1866a, p. 216]

Bartsch described the species in detail and included an illustration which is probably a drawing of the holotype. There is no indication in Bartsch's text as to what specimen the figure refers.

The holotype is in the U. S. National Museum and is labelled "San Diego, Cooper."

*Holotype.*—U. S. National Museum, no. 14933 [not no. 40933 as in Bartsch, 1911]

*Distribution.*—Recent. San Diego, California (type); San Pedro, California to Magdalena Bay, Lower California (Dall); Pleistocene (Woodring, Bramlette, and Kew, 1946, p. 67)

#### *Alabina turrita* (Carpenter)

(Pl. 20, fig. 12)

*Styliferina turrita* CARPENTER, 1864b, p. 613, 657; Reprint, 1872, p. 99, 143; 1866, *California Acad. Sci.*, Proc., vol. III, p. 219; COOPER, 1867, *Geog. Cat. Moll.*, *Geol. Sur. California*, p. 31; TRYON, 1886, *Man. Conch.*, vol. VIII, p. 286

*Alabina turrita* (Carpenter), BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 39, pl. 62, fig. 4 type; OLDROYD, 1927, vol. II, pt. III, p. 16, pl. 95, fig. 4 (type), same fig. as BARTSCH, 1911, see also *Aclis*; KEEN, 1937, p. 29 see also under *Aclis*; BURCH, 1945, no. 54, p. 27 see also under *Aclis*

*Aclis* (? *Aclis*) *turrita* (Carpenter), DALL, 1921, p. 120; OLDROYD, 1927, vol. II, pt. II, p. 83, KEEN, 1937, p. 28; BURCH, 1945, no. 53, p. 17

"Minute, slender, base rounded." [Carpenter, 1864b, p. 657]

Carpenter's description (1866) was republished by Oldroyd (1927). The following changes should be made in her copy.

Line two, p. 17, read space between "labro" and "postice"

Add:

"... div. 20°.

"Hab. S. Pedro, Cooper.

"A single specimen of this tiny shell was found in the shell-washings of Dr. Palmer's consignment. The mouth is unfortunately choked up with a grain of coarse sand which I have not been able to extract." [Carpenter, 1866a, p. 219]

Bartsch gave a description of this specimen and illustration of the holotype. The holotype is mounted on the original glass mount of Carpenter with Carpenter's original label, "Type S. Pedro."

The holotype has seven whorls plus the nuclear whorls. The nuclear whorls are pinkish. The specimen is white with the basal part of body whorl yellowish brown. The sutures are impressed. The aperture is filled with sediment. This condition was described by Carpenter.

*Holotype*.—U. S. National Museum, no. 15566

*Distribution*.—San Pedro, California (type); San Pedro to San Diego, California (Burch)

#### Family CERITHIOPSIDAE

#### Genus *Cerithiopsis* Forbes and Hanley, 1853

*Cerithiopsis* FORBES AND HANLEY, 1853<sup>82</sup> Hist. British Moll., vol. III, [1851 temporary title] p. 364

Type species by monotypy *C. tubercularis* (Montagu), MONTAGU, 1803, Testacea Britannica, pt. 1, p. 270 as *Murex*. Recent. Western Europe. TRYON, 1887, Man. Conch., vol. IX, pl. 35, figs. 20, 22–25, 27

#### *Cerithiopsis columna* Carpenter

*Cerithiopsis columna* CARPENTER, 1864b, p. 613, 628, 660; Reprint, 1872, p. 99, 114, 146; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 32; Reprint, 1872, p. 245; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 35; 1870, Amer. Jour. Conch., vol. VI, p. 67; KEEP, 1887, West Coast Shells, p. 48; TRYON, 1887, Man. Conch., vol. IX, p. 171, pl. 35, fig. 21; BARTSCH, 1911, U. S. Nat. Mus., Proc., vol. 40, no. 1823, p. 354, pl. 36, fig. 6 type; DALL, 1921, p. 144; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 139; 1927, vol. II, pt. 11, p. 273, pl. 68, fig. 6 type same as BARTSCH, 1911, BAILY, 1935, West Coast Shells (KEEP), p. 195; KEEN, 1937, p. 32; BURCH, 1945, no. 54, p. 19 under *incertae sedis*; SMITH AND GORDON, 1948, California Acad. Sci., ser. 4, vol. XXVI, no. 8, p. 195

"Very tall; nodules close, like strung figs." [Carpenter, 1864b, p. 660]

The republication of Carpenter's description (1865) has been included by Oldroyd (1927). The following changes should be made in her copy:

Line 4: read supra for supre; last line: .1 for 1; delete "poll."

Add:

"... div. 10°.

"Hab. Neeah Bay; several worn specimens (*Swan*): Monterey; rolled fragment of larger shell (*Cooper*).

"Easily recognized, even in portions, by the 'strung-fig' pattern."—[Carpenter, 1865a, p. 32]

Bartsch discussed this species in detail and illustrated the holotype. There is one specimen labelled, "type Neeah Bay W. T. J. G. Swan."

*Dimensions*.—Length 9.2 mm.; diameter 2.6 mm. (holotype) (Bartsch).

*Holotype*.—U. S. National Museum, no. 14823b

<sup>82</sup> See Sherborn (1922, p. LIV) for dates of volumes and pages.

*Distribution*.—Neah Bay, Washington (type); Vancouver Island to Monterey Bay, California (Dall)

Genus *Diastoma* Deshayes, 1850

*Diastoma* DESHAYES, 1850, *Traite élém. Conch.*, Expl. plates, Atlas, p. 46; COX, 1942, *Malacol. Soc. London, Proc.*, vol. 25, pt. 3, p. 95

Types species, *Melania costulata* LAMARCK, 1804, *Ann. du Mus.*, t. 4, p. 430; 1806, t. 8, pl. 60, 2, a, b, Lutetian Eocene, Paris Basin. DESHAYES, 1864, *Descrip. An. sans Vert.*, t. 2, p. 413 COSSMANN, 1906, *Essais Paléonconch. comp.*, liv. VII, pl. IV, figs. 18-19

*Diastoma fastigiatum* (Carpenter)

(Pl. 20, figs. 20, 21)

*Bittium fastigiatum* CARPENTER, 1864b, p. 537, 655; Reprint, 1872, p. 23, 141; 1865, *Ann. Mag. Nat. Hist.*, ser. 3, vol. XV, p. 181; Reprint, 1872, p. 283; COOPER, 1867, *Geog. Cat. Moll.*, *Geol. Sur. California*, p. 28; TRYON, 1887, *Man. Conch.*, vol. IX, p. 158 list only

*Diastoma fastigiatum* (Carpenter), BARTSCH, 1911, *U. S. Nat. Mus., Proc.*, vol. 39, no. 1803, p. 581, fig. 1; DALL, 1921, p. 144; OLDROYD, 1927, vol. II, pt. III, p. 10, pl. 73, fig. 1 same as BARTSCH, 1911; GRANT AND GALE, 1931, p. 758; KEEN, 1937, p. 35; BURCH, 1945, no. 54, p. 26

“Small, slender: apex normal: sutures indented, anterior rib strong.” [Carpenter, 1864b, p. 655]

Oldroyd (1927) republished Carpenter's description (1865). The following changes should be made in her copy:

Last line: for 25 read .25; for 19 read .19; for 09 read .09; delete “poll.”

Add:

“... div. 20°.

“*Hab.* Sta. Barbara (*Jewett*).” [Carpenter, 1865h, p. 181]

Nothing in Carpenter's writings of this species indicates that the type was a fossil. Carpenter's statements concerning the habitat refer to the species as of the Recent. This is particularly indicated (1864, p. 655) in the column of localities of the species. After *B. asperum* and *B. armillatum*, *fs* is attached to the Santa Barbara symbol. This symbol is not attached to the localities of *B. fastigiatum*. Bartsch (1911) presented a composite drawing of two specimens in the U. S. National Museum collected by Col. Jewett from Santa Barbara and quoted by Bartsch as from the “Lower Pleistocene.” Dall, Oldroyd, Grant and Gale, and Burch followed Bartsch and repeated the Pleistocene age as original. Bartsch is the authority for such an age based on his examination of U. S. National Museum specimens, which are not types. If the type were found and determined to be fossil such a type locality would be valid.

Photographs of two specimens which were ideally figured by Bartsch are included herein. They are labelled “Sta. Barbara Jewett”. They are not marked types. The type of this species has not been found. Oldroyd's statement about the type should be corrected as to place and number.

*Specimens figured*.—U. S. National Museum, no. 16256<sup>83</sup>

*Distribution*.—Santa Barbara, California (type); San Pedro, California (Strong in Burch)

Family EPITONIIDAE

Genus *Epitonium* Roeding in Bolten, 1798

(*Scala* Humphrey, 1797,<sup>84</sup> *Scalaria* Lamarck, 1801)

*Epitonium* ROEDING in BOLTEN, 1798, *Museum Boltenianum*, pt. 2, p. 91; WINCKWORTH, 1945, *Malacol. Soc. London, Proc.*, vol. 26, pts. 4, 5, p. 136-148; p. 139

Type species by subsequent designation, SUTER, 1913, *Man. New Zealand Moll.*, p. 319; *Turbo scalaris* LINNAEUS, 1767, *Syst. Nat.*, 12th ed., p. 1237 = *Scalaria pretiosa* LAMARCK, 1819, *Hist. Nat. An. sans Vert.*, vol. VI, pt. 2, p. 226. Living. Western Pacific. TRYON, 1887, *Man. Conch.*, vol. IX, pl. 11, fig. 31; DURHAM, 1937, *Jour. Paleont.*, vol. 11, no. 6, pl. 56, fig. 1

<sup>83</sup> Not 162561, as in Bartsch (1911, p. 582) and Oldroyd (1927, p. 11)

<sup>84</sup> Names in Humphrey, 1797, are not accepted by *Int. Rules Zool. Nomen.*, *Opin. Rend.*, no. 51.

*Epitonium cumingii* (Carpenter)

*Scalaria Cumingii* CARPENTER, 1856, Zool. Soc. London, Proc., p. 165; 1857, Rept. British Assoc. Adv. Sci. for 1856, p. 284, 336; 1860, Smith, Misc. Coll., vol. 2, art. 6, p. 10 Mexican and Panamic Province; 1864b, p. 613, 660; Reprint, 1872, p. 99, 146 San Diego; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34  
*Scala cumingii* (Carpenter), ORCUTT, 1915, Molluscan World, p. 78  
 Not *Eglesia cumingii* A. ADAMS, 1850, Zool. Soc. London, Proc., p. 204

The type locality of this species is Panama. Although Carpenter reported the species from San Diego, Cooper questioned that occurrence, and the species is not included at present in the list of upper California fauna. Orcutt (1915) gave the range from Monterey to Panama. The discussion will be included in the report on the types of the Carpenter species from the Panamic area.

Subgenus *Nitidiscala* de Boury, 1909

*Nitidiscala* DE BOURY, 1909, Jour. de Conchyl., vol. LVII, p. 257

Type species by original designation *Scalaria unifasciata* SOWERBY, 1847, Thes. Conch., vol. I, p. 98, pl. XXXIII, fig. 68. Recent. West Indies. TRYON, 1887, Man. Conch., vol. IX, pl. 14, fig. 55

"Epitonium (*Nitidiscala*) *crebricostatum*" (Carpenter)

(Pl. 20, figs. 27, 28; Pl. 22, fig. 11)

*Scalaria crebricostata* CARPENTER, 1864b, p. 613, 660; Reprint, 1872, p. 99, 146; 1866, California Acad. Sci., Proc., vol. III, p. 222; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1870, Amer. Jour. Conch., vol. VI, p. 67; TRYON, 1887, Man. Conch., vol. IX, p. 84; COOPER, 1888, 7th Ann. Rept. California State Min. Bur. p. 263. Not *S. (Fumio) crebricostata* STANLEY GARDNER, 1876, ref. fide DALL, 1917

*Epitonium (Nitidiscala) crebricostatum* (Carpenter), DALL, 1917, U. S. Mus. Proc., vol. 53, no. 2217, p. 478; 1921, p. 115; OLDROYD, 1924, Pub. Puget Sound Biol. Station vol. 4, p. 108; 1927, vol. II, pt. II, p. 61; STRONG, 1930, San Diego Soc. Nat. Hist., Trans., vol. VI, no. 7, p. 188; GRANT AND GALE, 1931, p. 858; BAILY, 1935, West Coast Moll. (KEEP), p. 180; KEEN, 1937, p. 35; BURCH, 1945, no. 52, p. 29; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 191 Monterey rec. doubted.

"Mus. Cum. no. 32: 15 sharp reflexed ribs, coronated against the sutures." [Carpenter, 1864b, p. 660, Monterey and San Diego]

Oldroyd republished Carpenter's description (1866). The following changes should be made in her copy:

Line 5: delete mm.

Add:

"... State Collection 393.

"... div. 26°

"Hab. Monterey, San Pedro, Cooper, common.

"= "*Scalaria*, unique" Mus. Cum. no. 32.

"Somewhat resembles *S. tenuis*, Sby., but is not so turritid." [Carpenter, 1866a, p. 222]

If Carpenter's remarks (1864) are accepted as the original description, specimen no. 32 in the Cumings Collection, British Museum, is the holotype of this species. On inquiry in regard to that specimen, the authorities of the Mollusca Section, (G. L. Wilkins, Feb. 21, 1950, personal communication) British Museum (Natural History), furnished the following information:

"A search of the larger number of specimens in the B. M. collection has revealed a specimen labelled 'crebricosta' Cpr. California Mus. Cuming. This label is considered to be a 'lapsus-calumni' for *crebricostata* Cooper, but unfortunately the specimen has no number, only a portion of the original label having been preserved, and, although several counts have been made, only 12 ribs appear to be present.

"In spite of the above rather disappointing details this shell seems to have the most likely claim to originality."

Through the courtesy of the British Museum (Natural History), a photograph of the above shell (B. M. 1950.3.29.1) is included herein.

The British Museum specimen corresponds in size, character of ribbing, shape, and number of varices ([11]-12) with those of the labelled "type" in the U. S. National Museum. The apex, however, is preserved in the British Museum shell.

There are two specimens, U. S. National Museum, no. 14831, labelled "Monterey Cooper type." The apex of each specimen is missing. One of the specimens is figured herein. It has 11 varices, whereas the other individual has 12 varices. Both shells have the horny operculum in place. Both specimens measure: length 9 mm.; greatest diameter 4.5 mm. These measurements approximate that of the British Museum shell: length 8.7 mm.  $\pm$ ; greatest diameter 3.6 mm.  $\pm$ .

In regard to the type depository, Oldroyd merely stated the no. [393] of the original California State Collection as given by Carpenter (1866). The early state numbers, if still retained, help to verify the authenticity of a type but do not indicate where the specimen might be at present or its modern number. Most of the original California State types are in the U. S. National Museum. Strong (1930) examined a lot in the University of California collection labelled "*Epitonium crebricostatum* Cpr., Cooper collection" and determined them as specimens of *E. tinctum*, except one single shell with a larger number of varices, which he thought might be the young of another species.

A summary of the characters of available "type" sources yield only specimens which are at variance with Carpenter's descriptions. They are as follows.—

*Type locality*.—The type locality is consistently mentioned as Monterey, with San Diego or San Pedro (Carpenter, 1864b, p. 613, 660; 1866, p. 222, Monterey, San Pedro; Cooper, 1867, Monterey to San Diego; 1870, Monterey to San Diego; 1888, Monterey to San Diego). Yet Smith and Gordon (1948), following Strong (1930), did not include the species from Monterey. Smith (*in* Burch, 1945), however, does admit that he has "one or two shells from Monterey that might possibly fit the requirements. . . ." The British Museum shell is labelled "California" only.

*Varices*.—Carpenter's description, 15 varices. U. S. National Museum, no. 14831, 11 and 12 varices; British Museum, 12 varices.

*Measurements*.—Carpenter (long. 0.7; lat. .18) = length 17.71 mm.; diameter 4.55 mm. U. S. National Museum no. 14831, each: length 9. mm.; diameter 4.5 mm.; British Museum shell: length 8.7  $\pm$  mm.; diameter 3.6  $\pm$  mm.

To choose a lectotype from the above specimens would mean that the Carpenter descriptions would be disregarded, and an analysis of the species would then be redrawn on the basis of the lectotype. In that case the species would probably be regarded as synonymous with *E. tinctum* or a form of the same.

If one takes Carpenter's notes at face value, the species is unknown and the riddle of its description unsolved. If the species is valid biologically, its presence is probably lurking under identifications of *E. indiaorum* or *E. tinctum*. In that case specific separation would involve a selection of a neotype. The choice would best be made by one who is familiar with large suites of West Coast Epitoniums.

Until the name of this form has a firmer foundation than at present the writer sees no authority for type locality or range. Cooper, Arnold, and Oldroyd (1925) catalogued the species from the Pleistocene of California. The earlier authors apparently believed they knew what the species was and differentiated it from *E. indiaorum* and *E. tinctum*.

*Type*.—Uncertain

*Specimens figured*.—U. S. National Museum, no. 14831; British Museum (Natural History), no. 1950, 3.29.1

*Distribution*.—Uncertain

#### *Epitonium* (Nitidiscala) *fallaciosum* Dall, 1921 =

*E. hindsii* Keep, 1911 = *E. tinctum* Carpenter, 1864, 1865

Not *Scalaria Hindsii* CARPENTER, museum label Smithsonian Inst., no. 46222 "San Pedro, P.P.C." = *E. cooperi* Strong, by lectotype selection, WOODRING, 1931, Nautilus, vol. 45, no. 1, p. 31

Not *Scalaria Hindsii* CARPENTER, 1856, Zool. Soc. London, Proc., p. 165; 1857, Rept. British Assoc. Sci. 1856, p. 284, 336

*Epitonium hindsii* KEEP, 1911, West Coast Shells, p. 183, fig. 174 by designation, DALL, 1921 = *E. tinctum* CARPENTER *fulc* STRONG, 1930, San Diego Soc. Nat. Hist., vol. VI, no. 7, p. 193

- Not *Epitonium fallaciosum* DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 478 *nomen nudum*  
*Epitonium (Nitidiscala) fallaciosum* DALL, 1921, p. 115 designated KEEP, 1911, p. 183, fig. 174; OLDROYD, 1927, vol. II, pt. II, p. 59 in part; STRONG, 1931, Nautilus, vol. 45, no. 2, p. 70  
*Epitonium (Nitidiscala) tinctum* STRONG, 1930, San Diego Soc. Nat. Hist., vol. VI, no. 7, p. 193 in part; GRANT AND GALE, 1931, p. 859 in part; BAILY, 1935, West Coast Shells (KEEP), p. 180, fig. 153 same as KEEP, 1911, fig. 174  
 Not *Epitonium fallaciosum* WOODRING, 1931, Nautilus, vol. 45, no. 1, p. 31 = *E. cooperi* STRONG, 1930, p. 196 expl. fig. 7 paratype

The points of the question of the validity of *E. fallaciosum* Dall (1917, p. 478) are clearly and adequately enumerated by Strong (1931 p. 70). Authors must agree with Strong that Dall (1917) did not give an adequate description of *E. fallaciosum*. Dall plainly stipulated why he was giving a new name and to what in general, but he did not give a description, figure, or type. Therefore, the name is a *nomen nudum* in 1917. The writer agrees with Strong that Dall's "well-known form from California which has 11 to 14 varices" would not help in differentiating the species. Certain critical points of the history of *E. fallaciosum* are repeated. The specific name is included herein, because its identification is associated with two of Carpenter's species, *E. hindsii* and *E. tinctum*.

Certainly in Dall's first mention of *E. fallaciosum* (1917) the name is a *nomen nudum*. But Dall (1921) specified a description and illustration of the species when he gave the reference to Keep (1911, p. 183, Fig. 174). This reference satisfies the rules of nomenclature (Art. 25a and Opinion no. 1 and validates the specific name from Dall (1921, not 1917). This may change the original meaning of Dall (1917), but since that usage may have applied to Carpenter's museum label it has no status under the International Zoological Code (Opinion no. 1).

Woodring's (1931) designation of the museum specimen which Dall probably had in mind would not validate the species because it would lack a description and figure. In this case Woodring designated a specimen which had been, subsequent to Dall's (1917) invalid mention of *E. fallaciosum*, included under and figured as a paratype of a new species *E. cooperi* by Strong (1930, p. 194, Pl. 20, fig. 7). But Dall had already (1921) validated his species by a different selection. The specimen of Keep (1911, Fig. 174) is the holotype of *E. fallaciosum* Dall (1921). Keep's description is included herein:

"In Figure 174 is shown the beautiful shell of *Epitonium hindsii*, Cpr., (*Scala hindsii*), the white Wentletrap.

"It is pure white in color, very delicate, and is generally less than an inch in length. The whorls are very distinct, finely rounded, and each one is crossed by about twelve thin, sharp ridges. These shells are so highly prized that they have been worn as the drops of ear-rings. . . . The white Wentle trap is found on the southern shores of California."

Strong believed that *E. fallaciosum* Dall (1921, not 1917) is equivalent to *E. tinctum* Carpenter (1864, 1865). From a comparison of the illustration of the lectotype of *E. tinctum* with Keep (1911, Fig. 174) this view would seem to be justified.

*Holotype*.—Specimen of Keep (1911, Fig. 174), whereabouts unknown

*Distribution*.—Southern California (Keep)

### ***Epitonium (Nitidiscala) indianorum* (Carpenter)**

(Pl. 20, figs. 23, 24)

*Scalaria indianorum* CARPENTER, 1864b, 628, 660, 683; Reprint, 1872, p. 114, 146, 169; 1865; Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 31; Reprint, 1872, p. 244; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1870, Amer. Jour. Conch., vol. VI, p. 67 ? *vide* SMITH AND GORDON; SOWERBY in REEVE, 1873, Conch. Icon., vol. 19, *Scalaria*, ? pl. XI, fig. 81; TRYON, 1887, Man. Conch., vol. IX, p. 70, ? pl. 14, figs. 48 copy REEVE, 1873, Conch. Icon., vol. 19, pl. XI, fig. 81; KEEP, 1887, West Coast Shells, p. 50; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 263

*Scala indianorum* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 210; ARNOLD, 1903, p. 264, pl. V, fig. 4

*Epitonium (Nitidiscala) indianorum* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 477; 1921, p. 115; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 107; 1927, vol. II, pt. II, p. 57; STRONG, 1930, San Diego Soc. Nat. Hist., vol. VI,



no. 7, p. 186, 192, pl. 20, figs. 1, lectotype, 2a, 2b; GRANT AND GALE, 1931, p. 859; BAILY, 1935, West Coast Shells (KEEP), p. 180; KEEN, 1937, p. 35; DURHAM, 1937, Jour. Paleont., vol. 11, no. 6, p. 487, pl. 56, fig. 14; BURCH, 1945, no. 52, p. 24, 27; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 191

*Epitonium (Gyroscale) indianorum* (Carpenter), ABBOTT, 1954, p. 165

“. . . Between *Turtonis* and *communis*: like “*Georgettina*, Kien. Mus. Cum. no. 34, Brazil.” [Carpenter, 1864b, p. 660]

Oldroyd (1927) republished Carpenter's original description (1865) of this species. The following corrections and additional lines should be made in her copy:

Last line: read 8 for .08; delete “poll.”

Add:

“. . . div. 28°.

“*Hab.* Neeah Bay (Swan).

“Strung as ornaments by the Indian children. Intermediate between *S. communis* and *S. Turtonis*, and scarcely differs from ‘*S. Georgettina*, Kien,’ Mus. Com. no. 34, Brazil.” [Carpenter, 1865a, p. 31]

The type material is in the U. S. National Museum and consists of five specimens (one a fragment of a body whorl). The label reads “Neeah Bay J. G. Swan.” The specimen figured by Strong (1930) as type is apparently the same specimen as figured herein (Pl. 20, fig. 23). Another specimen of the type group is figured herein (Pl. 20, fig. 24). The apices of all the specimens are gone. All specimens are white and slightly worn. The varices vary respectively, 15 in the largest specimen, 10 varices on the next largest, 14 varices on the next, and 11 on the smallest individual. Therefore, the number of varices might vary from 10 to 15, if all the specimens are retained in the species. The maximum number is the same as in Carpenter.

Strong (1930) presented the details in regard to this species, as well as the other West Coast species of *Nitidiscala*.

*Types*.—Lectotype and paratypes: U. S. National Museum, no. 15521

*Distribution*.—Recent. Neah Bay, Washington (type); Forrester Island, Alaska, to Todos Santos Bay, Lower California (Dall). Pleistocene. California (Arnold; Oldroyd, 1925; Waterfall, 1929; Grant and Gale; Durham; Willett, 1937). Pliocene. California (Martin, 1916; Waterfall, 1929; Grant and Gale; Durham). Miocene. California (Durham)

*Epitonium (Nitidiscala) subcoronatum* (Carpenter)

(Pl. 22, figs. 12, 13)

*Scalaria subcoronata* CARPENTER, 1864b, p. 613, 660; Reprint 1872, p. 99, 146; 1866, California Acad. Sci. Proc., vol. III, p. 221; COOPER, 1867, Geog. Cat. West Coast, Moll., Geol. Sur. California, p. 34; COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 67; TRYON, 1887, Man. Conch., vol. IX, p. 84

*Epitonium (Nitidiscala) subcoronata* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 478 *Spiniscala*; DALL, 1921, p. 115; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 107; 1927, vol. II, pt. II, p. 58

*Epitonium (Nitidiscala) tinctum* (Carpenter), STRONG, 1930, San Diego Soc. Nat. Hist., Trans., vol. VI, no. 7, p. 187, p. 193 in part, pl. 20, fig. 4 type; GRANT AND GALE, 1931, p. 859 in part; KEEN, 1937, p. 35; DURHAM, 1937, Jour. Paleont., vol. 11, no. 6, p. 488; BURCH, 1945, no. 52, p. 28

“Like young *communis*, with more and sharper ribs, faintly coronated when adolescent.” [Carpenter, 1864, p. 660]

Carpenter's description (1866) was republished by Oldroyd (1927). The following lines should be added to make that copy complete:

“. . . State Collection, no. 393a

“. . . div. 38°.

“*Hab.* Monterey; Cooper.

“Like *S. communis*, jun., but with the upper whorls slightly coronated.” [Carpenter, 1866a, p. 221]

Delete “mm.” in the Oldroyd copy.

The holotype of this species is in the U. S. National Museum. It is labelled “type Monterey Cooper.” The holotype has been figured by Strong (1930) as well as herein. The species is regarded as synonymous with *E. tinctum* Carpenter.

*Holotype*.—U. S. National Museum, no. 14830b (15732). The number in Strong (1930, p. 196, expl. Fig. 4) should be corrected from "13830b" to "14830b."

*Distribution*.—Monterey, California (type); Vancouver Island, British Columbia, to San Diego, California (Dall)

#### **Epitonium (Nitidoscala?) tiara (Carpenter)**

*Scalaria tiara* CARPENTER, 1856, Zool. Soc. London, Proc., p. 164; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 284, 336; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 10 Mexican and Panamic province; 1864b, p. 624; Reprint, 1872, p. 110

*Epitonium (Nitidiscala) tiara* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 480; 1921, p. 115; OLDROYD, 1927, vol. II, pt. II, p. 59; STRONG, 1930, San Diego Soc. Nat. Hist., Trans., vol. VI, no. 7, p. 190; KEEN, 1937, p. 35; BURCH, 1945, no. 52, p. 30

This species described from Panama was listed by Dall from Catalina Island, California, to Todos Santos Bay, Lower California, with a "?" as to Panama. Burch also regarded the species from the San Diego and Catalina area.

G. L. Wilkins (Oct. 17, 1950, personal communication) informed the writer that there are:

"Three specimens of this shell in the Cuming Collection one of which agrees with the size given in P.Z.S. 1856. The locality given for the three is 'Matxlam' and not 'Panama' (In Sinu Panamensi) as in the P.Z.S. It is quite possible that the small one is the type, the other two, with a different locality being added by Cuming later. It is well known that he was careless in such matters."

*Type*.—Not found

#### **Epitonium (Nitidiscala) tinctum (Carpenter)**

*Scalaria ? Indianorum* var. CARPENTER, 1864b, 613; Reprint, 1872, p. 99. For additional synonymy and notes, see *E. tinctum* Carpenter, subheading

*Scalaria subcoronata* CARPENTER, 1864b, p. 613, 660; Reprint, 1872, p. 99, 146. For additional synonymy and notes, see *E. subcoronatum* subheading

*Epitonium hindsi* KEEP, 1911, West Coast Shells, p. 183, fig. 174 = *E. fallaciosum* DALL, 1921, p. 115 not *E. fallaciosum* Dall, 1917. For additional synonymy and notes, see *E. fallaciosum* Dall, 1921, subheading

So that the details of each of the names of the above may be more easily analyzed, the writer kept them under separate subheadings. All the data should be combined under the species *E. tinctum* (Carpenter).

*Types*.—*E. tinctum*, s.s.: holotype not found; lectotype, U. S. National Museum, no. 19510. *E. subcoronatum* Carpenter: holotype, U. S. National Museum, no. 14830b; *E. fallaciosum*, Dall, 1921: Keep, (1911, Fig. 174)

*Distribution*.—Recent. San Pedro, California (type, *E. tinctum*, s.s.); Vancouver Island, B. C., (as *E. subcoronatum* to Gulf of California (*E. tinctum*, s.s.). Pleistocene. California (Cooper; Arnold; Oldroyd, 1925; Grant and Gale; Willett, 1937; Durham); Mexico (Jordan, 1926). Pliocene. California (Cooper, 1888; Grant and Gale; Durham)

#### **Epitonium (Nitidiscala) tinctum (Carpenter)**

*Scalaria ? Indianorum* var. CARPENTER, 1864b, p. 613; Reprint, 1872, p. 99

*Scalaria ?* var. *tincta* CARPENTER, 1864b, p. 660; Reprint, 1872, p. 146

*Scalaria* (? *Indianorum*, var.) *tincta* CARPENTER, 1864b, p. 660, 665; Reprint, 1872, p. 146, 151; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 31; Reprint, 1872, p. 244; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1870, Amer. Jour. Conch., vol. VI, p. 67; TRYON, 1887, Man. Conch., vol. IX, p. 70, pl. 14, fig. 49

*Scala tincta* ARNOLD, 1903, p. 265 in part, p. 265, pl. V, fig. 3 = *Epitonium (Nitidiscala) cooperi* STRONG, 1930, San Diego Soc. Nat. Hist., Trans., vol. IV, no. 7, p. 194

*Epitonium (Nitidiscala) tincta* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 477; 1921, p. 115; OLDROYD, 1927, vol. II, pt. II, p. 58; STRONG, 1930, San Diego Soc. Nat. Hist., Trans., vol. IV, no. 7, p. 186, p. 193 in part, pl. 20, fig. 3; GRANT AND GALE, 1931, p. 859 in part; BAILY, 1935, West Coast Shells (KEEP), p. 180, fig. 153

same fig. as *S. hindsii* in KEEP, 1911, p. 183, fig. 174 = *E. fallaciosum* DALL, 1921; KEEN, 1937, p. 36; DURHAM, 1937, Jour. Paleont., vol. 11, no. 6, p. 488; BURCH, 1945, no. 52, p. 27

“. . . Purple-brown behind: like *regularis*, without spiral sculpture.” [Carpenter, 1864b, p. 660]

“*S. ? Indianorum* costis acutis, haud reflexis anfractibus postice fuscopurpureo tinctis.

“*Hab.* Cerros Island (*Ayres*); S. Pedro (*Cooper*).

“The Lower-Californian shell may prove distinct. It is like *S. regularis*, Cpr., but without the spiral sculpture.” [Carpenter, 1865a, p. 31]

The holotype of this species has not been found. Oldroyd's statement that the type (original) is in the U. S. National Museum is not correct. If other conditions are equal, the type locality depends on whether one accepts Carpenter's (1864b) lines as adequate and the original description. If so, Lower California or San Diego would be the type locality. Carpenter's (1865) description adds “San Pedro.” He did not give measurements. Strong (1930) figured the specimen, U. S. National Museum, no. 19510, which had been collected by Cooper from San Pedro and suggested that this specimen might be the one Carpenter had available (1865). This deduction seems reasonable, and in lieu of a holotype or other syntypic material this specimen is the proper shell to be chosen as a lectotype. The writer therefore chooses U. S. National Museum, no. 19510 (Strong, 1930, Pl. 20, fig. 3) as the lectotype of *E. tinctum* Carpenter. Durham (1937) would have had to go through the same process of selection to have determined the type locality as San Pedro.

Strong discussed this species thoroughly as to characters and literature. He figured the lectotype, and a figure is therefore not included herein.

*Dimensions*.—Length 10.5 ± mm.; greatest diameter 4.5 mm. ± (lectotype, Strong)

*Lectotype*.—U. S. National Museum, no. 19510

*Distribution*.—San Pedro, California (type, *E. tinctum*); Monterey, California, to Gulf of California (Dall)

#### Subgenus *Asperiscala* de Boury, 1909

*Asperiscala* DE BOURY, 1909, Jour. de Conchyl., vol. 57, p. 258

Type species by original designation, *Scalaria bellistriata* CARPENTER, 1864b, p. 660. Recent. Monterey to San Diego, California. (Pl. 20, fig. 25, 26.)

#### *Epitonium (Asperiscala) bellistriatum* (Carpenter)

(Pl. 20, figs. 25, 26)

*Scalaria bellistriata* CARPENTER, 1864b, p. 613, 660; Reprint, 1872, p. 99, 146; 1866, California Acad. Sci., vol. III, p. 221; COOPER, 1867, Geog. Cat. Moll., Geol. Sur California, p. 34; 1888, 7th Ann. Rept. California State Min. Bur., p. 263; TRYON, 1887, Man. Conch., vol. IX, p. 84

*Scala bellastrata* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 209; ARNOLD, 1903, p. 263, pl. IX, fig. 17; COSSMANN, 1912, Essais de Paleoonchologie Comp., liv. 9, p. 28, pl. II, figs. 42, 50 section *Asperiscala*

*Epitonium (Asperiscala) bellastrata* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 475; 1921, p. 114 *Asperoscala* [sic]; OLDROYD, 1927, vol. II, pt. II, p. 55 *Asperoscala* [sic]; GRANT AND GALE, 1931, p. 857; BAILY, 1935 West Coast Shells (KEEP), p. 179; KEEN, 1937, p. 35; DURHAM, 1937, Jour. Paleont., vol. 11, no. 6, p. 489; BURCH, 1945, no. 52, p. 22, 23; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 190

“Shape like *pretiosa*, jun.; ribs very close, spinous at shoulder, crossed by spiral riblets.” [Carpenter, 1864b, p. 660]

Oldroyd (1927) republished Carpenter's description (1866). The following changes should be made in her copy:

Delete “poll,” last word.

Add:

“. . . div. 40.° . . . State Collection, no. 393, b.

“*Hab.* Monterey, a fragment: San Diego, 1; San Pedro, 3; *Cooper*.”

“So different in sculpture from *S. pretiosa* and other species with which it agrees in shape, that there will be no difficulty in recognizing perfect specimens.” [Carpenter, 1866a, p. 221]

There is a broken specimen in the U. S. National Museum which was labelled "type? Cooper." Some later investigator added "?" in pencil and marked it "paratype." However, the first specimen mentioned by Carpenter was a "fragment" from Monterey, which would coincide with the U. S. National Museum specimen. The syntypes from San Diego and San Pedro have not been found.

Arnold's figure is a good representation of the species.

*Lectotype*.—U. S. National Museum, no. 14831b

*Distribution*.—Recent. Monterey, California (type); Monterey to San Diego, California (Dall). Pleistocene.<sup>85</sup> California (Cooper; Arnold; Grant and Gale; Willett, 1937)

Genus *Opalia* H. and A. Adams, 1853  
(*Psychrosoma* Tapparone—Canefri, 1876.)

*Opalia* H. AND A. ADAMS, 1853, Gen. Rec. Moll., vol. I, Nov., p. 222. CLENCH AND TURNER, 1950, Johnsonia, vol. 2, no. 29, p. 231 selection of type species of *Psychrosoma* Tapparone-Canefri, 1876

Type species by subsequent designation, DE BOURY, 1886, Mon. Scaldiae Viv. Fos., pt. I, *Crisposcala*, p. XXV, *Opalia australis* LAMARCK, 1843, An. sans Vert., 2d ed., vol. IX, p. 76. Recent Australia. SOWERBY in REEVE, 1874, Conch. Icon., vol. 19, *Scalaria*, pl. 1, fig. 3; TRYON, 1887, Man. Conch., vol. IX, pl. 16, fig. 90; DURHAM, 1937, Jour. Paleont., vol. 11, no. 6, pl. 56, fig. 2

*Opalia evicta* de Boury  
(Pl. 20, fig. 22)

*Opalia pluricostata* CARPENTER, ms: DALL, 1917 = *O. evicta* DE BOURY, 1919, Jour. de Conchyl., vol. LXIV, p. 36

*Scala* (*Cirsotrema*) [*sic*] *montereyensis* DALL, 1907, Nautilus, vol. 20, no. 11, p. 128. For remainder of synonymy of this species see BERRY, 1948, Jour. Ent. Zool., vol. 40, no. 1, p. 15, fig. 1-5; BURCH, 1948, no. 79, p. 5. Not *S. hellenica montereyensis* DE BOURY, 1889 nor *Epitonium montereyense* DALL, 1917 = *S. regiomontana* Dall in DE BOURY, 1919

*Opalia pluricostata* BERRY, 1907, Nautilus, vol. 21, no. 4, p. 42 no description; DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 473 museum label of Carpenter; not *O. pluricostata* DE BOURY, 1913, Jour. de Conchyl., vol. 61, p. 97

*Scalaria* (*Opalia*) *evicta* DE BOURY, 1919, Jour. de Conchyl., vol. 64, p. 36 not vol. 44, as in DALL, 1921, or BERRY, 1948; STRONG, 1937, Nautilus, vol. 51, no. 1, p. 4, 6, pl. 2, fig. 11; KEEN, 1937, p. 43; BURCH, 1948, no. 79, p. 5

*Epitonium* (*Opalia*) *evictum* (de Boury), DALL, 1921, p. 114; OLDRYD, 1927, vol. II, pt. II, p. 52; BURCH, 1945, no. 52, p. 17

Three specimens of this species labelled "*Opalia borealis* var. *pluricostata* Carpenter types Neeah [*sic*] Bay, W. T. J. G. Swan," are in the U. S. National Museum. They are the specimens used by Dall when he described the species.

The name was one given by Carpenter on a label or in manuscript. A photograph of one of the syntypes has been co-operatively provided by the U. S. National Museum (Smithsonian Institution) authorities.

Oldroyd republished De Boury's remarks concerning the history of the trivial name.

It has been suggested by Strong (1937; in Burch, 1945) that this name is synonymous with *O. montereyensis* (Dall)<sup>86</sup> (1907; 1917, p. 477 not p. 481) in that the type of the latter is young *Opalia evicta*. Berry (1948) after a restudy of the names and specimens involved agreed that *O. evicta* is an immature *O. montereyensis*. For further notes regarding that species see Berry. This discussion is only to incorporate the portion concerning the manuscript name of Carpenter.

The name *Scalaria montereyensis* was first used by De Boury in 1889 (1919, p. 39) as a variety" of "*S. hellenica* Forbes (1844) which he later separated as a distinct species. Dall

<sup>85</sup> Species not recorded by Durham (1937) is oversight. Durham, Oct. 2, 1950, personal communication.

<sup>86</sup> Dall (1907, p. 128 as *Cirsotrema*; Strong, 1937, p. 7, Pl. 2, fig. 12 type)

applied the name to a West Coast "*Scala*" (1907) and later to another species from the same region (1917).<sup>87</sup> The *Epitonium montereyense* Dall (1917, p. 481) was renamed *S.* [= *Epitonium*] *regiomontana* Dall in De Boury (1919) (Keen in Burch, 1945, p. 31). This name is not accounted for in Berry (1948, p. 15), nor is the fact that *E. montereyense* Dall (1907) is preoccupied by that of De Boury (1889). Fortunately the name of *Opalia evicta* de Boury is available and to which the species may remain listed, the same as in Dall (1921, p. 114).

*Dimensions*.—Length 16 mm.; diameter 5 mm. (Dall)

*Syntypes*.—U. S. National Museum no. 23397 (Dall, no. 56054), *O. pluricostata* Dall

*Distribution*.—Neah Bay, Washington (type, *O. pluricostata*); Forrester Island, Alaska, to Magdalena Bay, Lower California (Dall)

#### Subgenus *Dentiscala* de Boury, 1886

*Dentiscala* DE BOURY, 1886, Monographie des Scalidae vivante et fossiles, I, pt. 1, p. XXI  
Type species by monotypy, *D. crenata* (LINNAEUS), 1758, Syst. Nat., p. 765 as *Turbo*. Living. Mediterranean and Atlantic, TRYON, Man. Conch., 1887, vol. IX, pl. 16, fig. 97; CLENCH AND TURNER, 1950, Johnsonia, vol. 2, no. 29, pl. 100, fig. 4; pl. 101, figs. 1-3

#### *Opalia* (*Dentiscala*) *insculpta* Carpenter

(Pl. 22, figs. 4, 5)

*Opalia* (? *crenatoidea*, var.) *insculpta* CARPENTER, 1864b, p. 539, 619, 660; Reprint, 1872, p. 25, 105, 146; 1866, Ann. Mag. Nat. Hist., ser. 3, vol. XVII, p. 275, 277; Reprint, 1872, p. 322, 324; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1888, 7th Ann. Rept. California State Man. Bur., p. 255

*Dentiscala crenatoidea* (Carpenter), COSSMANN, 1912, Essais de Paléoconchologie Comp., 9 liv., p. 90 should have been var. *insculpta*

*Epitonium* (*Dentiscala*) *insculpta* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217; p. 473; BAKER, HANNA, AND STRONG, 1930, California Acad. Sci., Proc., ser. 4, vol. XIX, p. 48; GRANT AND GALE, 1931, p. 855 *D. insculptum*

*Dentiscala insculpta* (Carpenter), VAN WINKLE [Palmer], 1921, Bull. Amer. Paleont., vol. VIII, no. 36, p. 4, pl. 1, figs. 10, 11 holotype

*Epitonium insculptum* (Carpenter), WILLETT, Nautilus, vol. 52, no. 1, p. 10

*Epitonium crenimarginatum* Dall, WILLETT, 1938, Nautilus, vol. 52, no. 1, p. 10

*Opalia* (*Dentiscala*) *insculpta* (Carpenter), BURCH, 1945, no. 52, p. 18; BURCH, 1947, no. 74, p. 24; ABBOTT, 1954, p. 162

"Like the *C. S. L.* form and *crenata*, but ribs closer, without spiral sculpture, sutural holes behind the basal rib."—[Carpenter, 1864b, p. 660]

"*O. testa O. crenatoidei* simili; sed costis radiantibus pluribus, XIII—XVI, in spira validis anfr. ult. obsolete; sculptura spirali nullis; punctis suturalibus minus impressis, circa fasciam basalem laevem postice, non antice continuis.

"*Hab.* Sta. Barbara, Pleistocene, 1 sp. (*Jewett*).

"Very closely related to *O. crenatoidea*, now living at Cape St. Lucas, and, with it, to the Portuguese *O. crenata*. It is quite possible that the three forms had a common origin." [Carpenter, 1866h, p. 277]

The exterior of the shell of this type has been worn away except in the sutural region, hence the exact character of the longitudinal ribs cannot be described. However, prominent impressions of each reveal 14 ribs on the whorls.

This specimen has an original label which reads, "Drawn by Sowerby for the SI."

*Dimensions of type*.—Length 14 mm.; greatest diameter 7 mm.

*O. crenimarginata* (Dall) (1917c, p. 473) is thought, particularly by Strong (Baker, Hanna, and Strong, 1930; Smith and Gordon, 1948) to be a synonym of the fossil, *O. insculpta* Carpenter. This combination is the basis of the range in the Recent fauna from "Monterey [?] to Puerto Libertad, West Mexico," for *O. insculpta*. Those who are familiar with the Monterey shells doubt the existence of the species in that area (Smith and Gordon, 1948, p. 190).

The holotype of *O. insculpta* is so badly worn that the writer questions Carpenter's authority for stating that there was no spiral structure. *O. insculpta* has 14 longitudinal ribs,

<sup>87</sup> Dall (1917, p. 481) not same *Epitonium* as on page 477 = *Opalia pluricostata* Cpr. ms. Dall (1917) = *Scalaria* (*Opalia*) *evicta* de Boury (1919).

whereas *O. crenimarginata* has only 12. If the two forms are the same the description of such ribs in the species should be increased to include the larger number.

*Holotype*.—Paleontological Laboratory, no. 4950, Cornell University, Ithaca, N. Y.

*Distribution*.—Pliocene—Pleistocene, Santa Barbara formation, Santa Barbara, California (type). Recent. *O. crenimarginata* Dall, Monterey?, California, to Puerto Libertad, west Mexico (Dall, modified by Willett and by Strong)

#### Subgenus *Nodiscala* de Boury, 1889

*Nodiscala* DE BOURY, 1889, Boll. Soc. Malacologica Italiana, vol. XIV, p. 168

Type species by original designation, *Scalaria bicarinata* SOWERBY, 1844, Zool. Soc. London, Proc., p. 30. Living. Philippines. TRYON, 1887, Man. Conch., vol. IX, pl. 17, fig. 28

#### *Opalia* (*Nodiscala*) *bullata* Carpenter

= *O. (Nodiscala) spongiosa* Carpenter, which see

(Pl. 22, fig. 6)

*Opalia bullata* CARPENTER, 1864b, p. 537, 660; Reprint, 1872, p. 23, 146; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 397; Reprint, 1872, p. 287; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 35; ORCUTT, 1915, Moll. World, p. 38

Not *Scalaria bullata* SOWERBY, 1844, Zool. Soc. London, Proc., p. 27; 1843, Thes. Conch., vol. I, p. 94 bis, pl. XXXIV, fig. 87. Not an *Opalia*.

*Scalaria (Psychrosoma) Crossciana* TAPPARONE-CANEFRI, 1876, Jour. de Conchyl., vol. 24, p. 154; TRYON, 1887, Man. Conch., vol. IX, p. 84 *Psychrosoma*, p. 50 = *Opalia*.

"Shape of *Rissoina*: with sutural bosses: no basal rib." [Carpenter, 1864b, p. 660]

"*O. testa* minore, alba, subdiaphona, turrata, gracili; marginibus spirae subrectis; tota superficie minutissime et creberrime spiraleriter striolata; vertice nucleoso declivi, celato; dein anfr. ii., globosis, radiatim haud sculptis; dein v. normalibus, planatis, suturis vix impressis; lirulis radiantibus circ. XXVI., haud nisi in anfr. primis expressis, circa basin irregulariter rotundatam ad axim continuis; serie bullularum suturalium anfr. primis e lirulis extantibus formata, postea lirulis haud convenientibus, anfr. penult. circ. XVII., planatis, super suturas parieti appressis, interstitiis haud infossis; basi subangulata, haud costata; apertura subovali, sinistrosium subplanata; peritremate continuo, calloso; labro haud sinuato. Long. .3, long. spir. .21, lat. .09, div. 20°.

"*Hab.* Sta. Barbara, one specimen (*Jewett*)." [Carpenter, 1865i, p. 397]

Carpenter (1864b, p. 660) in describing "*O. retiporosa*" stated that the shell was similar to *O. bullata* but was different in sculpture.

The holotype of *O. bullata* is in much better condition than that of either *O. retiporosa* or *O. spongiosa*. It resembles the holotype of *O. spongiosa* more than *O. retiporosa* in the less angulated whorls.

The holotype is in the Redpath Museum. It is mounted on glass with the label, "type Sta. Barbara Jewett."

*O. spongiosa* has priority in naming (see under that name). *O. bullata* is not preoccupied by *Scalaria bullata* Sowerby, as thought by Tappanone—Canefri, because Sowerby's species is not an *Opalia*.

*Holotype*.—Redpath Museum, no. 76

*Distribution*.—Santa Barbara, California (type)

#### *Opalia* (*Nodiscala*) *spongiosa* Carpenter

The holotypes of *O. spongiosa* and *O. bullata* appear to represent the same species. *O. retiporosa* is defined by a holotype which has the whorls more angulated than the holotypes of the two former names. *O. retiporosa* has a varix.

*O. retiporosa* has been placed by workers (Dall, 1917; Oldroyd, 1927; Grant and Gale, 1931; Durham, 1937, Smith and Gordon, 1948) in *Nodiscala*. From a brief survey of species identified as *Dentiscala* and *Nodiscala*<sup>88</sup> and a comparison of the type species one wonders about the importance of separating *Dentiscala* and *Nodiscala*. *Dentiscala* has priority. Until examination of specimens of type species is available the writer retains the species in (*Nodiscala*).

<sup>88</sup> See Clench and Turner (1950) for a fine series of pictures.

**Opalia (Nodiscala) spongiosa** Carpenter

(Pl. 22, figs. 1-3, 6-8)

*Opalia spongiosa* CARPENTER, 1864b, p. 613, 660; Reprint, 1872, p. 99, 146; 1865, Ann. Mag. Nat. Hist., vol. XV, p. 13 mention; Reprint, 1872, p. 244; 1866, California Acad. Sci., Proc., vol. III, p. 222; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1870, Amer. Jour. Conch., vol. VI, p. 67

*Scalaria spongiosum* (Carpenter), TRYON, 1887, Man. Conch., vol. IX, p. 84

*Epitonium (Nodiscala) spongiosum* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 474; 1921, p. 114; OLDROYD, 1927, vol. II, pt. 2, p. 53; Keen, 1937, p. 35; BURCH, 1945, no. 52, p. 19, 21; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 190

*Opalia retiporosa* CARPENTER, 1864b, p. 613, 660; Reprint, 1872, p. 99, 146; 1865, Ann. Mag. Nat. Hist., vol. XV, p. 31 mention; Reprint, 1872, p. 244; 1866, California Acad. Sci., Proc., vol. III, p. 222; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 35

*Scalaria retiporosa* (Carpenter), TRYON, 1887, Man. Conch., vol. IX, p. 84

*Epitonium (Nodiscala) retiporosa* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2217, p. 474; 1921, p. 114; OLDROYD, 1927, vol. II, pt. 2, p. 54; BAKER, HANNA, AND STRONG, 1930, California Acad. Sci., Proc., ser. 4, vol. XIX, p. 45, pl. 2, fig. 3; GRANT AND GALE, 1931, p. 855; KEEN, 1937, p. 35; BURCH, 1945, no. 52, p. 19, 21; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 190

*Opalia (Nodiscala) retiporosa* Carpenter, DURHAM, 1937, Jour. Paleont., vol. 11, no. 6, p. 505, pl. 57, fig. 19

*Epitonium spongiosum* Carpenter, WILLET in BURCH, 1943, no. 20, p. 13 = *E. retiporosum*. See also *O. bullata* Carpenter

"Like small, very slender *granulata*: surface riddled with deep punctures in spiral rows." [Carpenter, 1864b, p. 660, *O. spongiosa*]

Carpenter's description (1866) was republished by Oldroyd (1927). The following changes should be made in her copy:

Last line: delete "poll."

Add:

"... div. 20°.

"*Hab.* Monterey, Cooper. From shell washings.

"The solitary specimen has the general aspect of *O. granulosa* on a very small scale." [Carpenter, 1866a, p. 222, *O. spongiosa*]

The holotype of "*O. spongiosa*" is in the U. S. National Museum. It is labelled "type Cooper Monterey."

There are microscopic punctations over the whole shell. The apex on the holotype is gone. On the upper three whorls there are longitudinal ribs which extend the length of the whorl; on the next whorl the ribs do not extend the full length of the whorl, and they become less conspicuous in length on the lower whorls. The ribs have the appearance of being tucked in at the suture.

"Sculpture in network, with deep holes. 40 fm. d.r. *Cp.*" [Carpenter, 1864b, p. 660, *O. retiporosa*]

Oldroyd (1927) republished Carpenter's description (1866). The following typographical errors and additions should be made to make the copy complete:

Line 2: add question mark after "nucl."; line 6: read "retiporosa" for "retriprosa"; last line: delete "poll", add "div. 20°"

Add:

"State Collection no. 1014

"

"*Hab.* Catalina Island; 3 dead in 40 fm.; *Cooper.*

"The texture has a rotten appearance; yet one of the specimens was stained with purple, and contained the dried remains of the animal, with its operculum. In the endeavor to extract this, the shell gave way." [Carpenter, 1866a, p. 222, *O. retiporosa*]

The holotype *O. retiporosa* is in the U. S. National Museum. The label reads, "Type Catalina Cooper." The type is not at the University of California, as surmised by Grant and Gale from the original data as presented by Oldroyd, nor is it lost, as suggested by Durham.

The holotype, as may be seen from the photograph, is badly worn with the body whorl broken. The break was occasioned by Carpenter as mentioned by him. The specimen has fine punctations like "*E. spongiosum*", but it has fairly strong longitudinal ribs. Inside the aperture the surface is flecked with bluish purple. This condition was noted by Carpenter.

A comparison made of the holotypes of *O. spongiosa* and *O. retiporosa* convinces one that the two forms are synonymous. This is in agreement with the collecting data and opinion of workers (Willett; Strong; Burch) that only one species exists. *O. bullata* is similar to *O. spongiosa*.

The writer arranged the data on each name separately, so that the facts could be evaluated more readily. In the original references the name and description of both species are on the same page. *O. spongiosa* is mentioned first in all cases, so that name has priority over *O. retiporosa*. In the original reference, it is also mentioned before *O. bullata* Carpenter. *O. bullata* was given a more detailed description by Carpenter (1865), before that of the other two names (1866).

*Types*.—U. S. National Museum, holotype, "*O. spongiosa*," no. 14830; holotype, *O. retiporosa*, no. 11843

*Distribution*.—Recent. Monterey, California (type, "*O. spongiosa*"; type, *O. retiporosa*, Catalina Island); off Oregon coast in 50 fathoms, to Lower California (Dall). Pliocene (Moody, 1916)

Family EULIMIDAE (Melanellidae)

Genus *Balcis* Leach in Gray, 1847

*Balcis* LEACH in GRAY, 1847, Ann. Mag. Nat. Hist., vol. XX, p. 271

Type species by monotypy WINCKWORTH<sup>89</sup>, 1934, Jour. Conch., vol. 20, no. 1, p. 13, *Balcis Montagu* = *Helix polita* MONTAGU, 1803, Test. Britannica, vol. II, p. 398 = *B. alba* (DA COSTA), 1778, Brit. Conch., p. 116 as *Strombiformis albus*. Living. Northern Europe.

*Balcis compacta* (Carpenter)

*Eulima compacta* CARPENTER, 1864b, p. 613, 659; Reprint, 1872, p. 99, 145; 1866, California Acad. Sci., Proc., vol. III, p. 221; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; TRYON, 1886, Man. Conch., vol. VIII, p. 278; VANATTA, 1899, Acad. Nat. Sci., Philadelphia, Proc., vol. 51, p. 255, 256, pl. XI, figs. 11, 12

*Melanella (Melanella) compacta* (Carpenter), BARTSCH, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2207, p. 314, pl. 37, fig. 3 lectotype

*Melanella compacta* (Carpenter), DALL, 1921, p. 118; OLDROYD, 1927, vol. II, pt. II, p. 77, pl. 40, fig. 3 same as BARTSCH, 1917, lectotype; KEEN, 1937, p. 40

*Balcis compacta* (Carpenter), BURCH, 1945, no. 53, p. 6, 8, 11; BERRY, 1954, Bull. Amer. Paleont., vol. 35, no. 151, p. 4

"Small, with blunt spire and elongated base." [Carpenter, 1864b, p. 659, locality between San Diego and San Pedro]

Oldroyd (1927) republished Carpenter's description (1866). The following changes should be made in her copy:

Line 1: read "tereti": for "terti": last line: delete "poll."

Add:

"... div. 22°.

"Hab. San Pedro; Cooper.

"A single dead shell was found in Dr. Palmer's consignment." [Carpenter, 1866a, p. 221 (? var.)]

Bartsch gave a complete discussion and illustration of the lectotype. The syntypes bear the label, "Type Cooper San Pedro." There are two specimens.

*Dimensions*.—Length 6.8 mm.; diameter 2.2 mm. (lectotype, Bartsch)

*Lectotype and paratype*.—U. S. National Museum, no. 13517b

*Distribution*.—San Pedro, California (type); San Pedro, California, to Point Abrejos, Lower California (Dall). Pleistocene. Long Wharf Canyon, Santa Monica (Berry)

<sup>89</sup> Two of the three species listed by Winckworth are nude names.



**Balcis micans** (Carpenter)

*Eulima micans* CARPENTER, 1864b, p. 603, 613, 659, 683; Reprint, 1872, p. 89, 99, 145, 169; 1865 Aug., Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 63; REEVE 1865, Dec., Conch. Icon., vol. 15 *Eulima*, pl. IV, fig. 33; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1870, Amer. Jour. Conch., vol. VI, p. 66; TRYON, 1886, Man. Conch., vol. VIII, p. 272, pl. 69; figs. 29, 30; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 209; VANATTA, 1899, Acad. Nat. Sci. Philadelphia, Proc., vol. 51, p. 256, pl. XI, figs. 1, 2; ARNOLD, 1903, p. 269, pl. IX, fig. 12

*Melanella* (*Melanella*) *micans* (Carpenter), BARTSCH, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2207, p. 303, pl. 34, figs. 1-6 (6 = type)

*Melanella micans* (Carpenter), DALL, 1921, p. 118 section *Eulima*; OLDROYD, 1927, vol. II, pt. II, p. 74 section *Eulima*; GRANT AND GALE, 1931, p. 863 section *Eulima*; KEEN, 1937, p. 40

*Melanella* (*Eulima*) *micans* (Carpenter), BAILY, 1935, West Coast Shells (KEEP), p. 181, fig. 154

*Balcis micans* (Carpenter), BURCH, 1945, no. 53, p. 6, 8, 10; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 192; BERRY, 1954, Bull. Amer. Paleont., vol. 35, no. 151, p. 4

"S. Diego, Cat. Is., 30-40 fm. (Also Puget Sound, *Kennerley*.)" [Carpenter, 1864b, p. 613]

"Perhaps a small var. of the European *polita*. 30-40 fm. living. *Cp.*" [Carpenter, 1864b, p. 659]

A republication of the original description (1865) was included by Oldroyd (1927). The following changes should be made in her copy:

Delete "poll."

Add:

"... div. 25°.

"*Hab.* In sinu Pugetiano specimen juniore Kennerley. Juxta Neeah Bay idem legerunt Swannii Indianuli. Plurimos adultos viventes inter S. Pedronem et S. Diegonem, in insulâ quoque Catalinam piscavit Cooper.

"An *Eu. politae* varietas Pacifica?" [Carpenter, 1865, p. 63]

Bartsch gave a thorough discussion and figured the holotype of this species. The type was collected by Cooper at San Pedro.

*Dimensions*.—Length 9.5 mm.; diameter 3 mm. (holotype, Bartsch)

*Holotype*.—U. S. National Museum, no. 14850

*Distribution*.—Recent. San Pedro, California (type); Vancouver Island, British Columbia, to Point Abrejos Lower California (Dall). Pleistocene. California (Cooper, 1888; Arnold; Grant and Gale; Willett, 1937; Berry, 1954); Mexico (Jordan, 1926)

**Balcis rutila** (Carpenter)

*Eulima rutila* CARPENTER, 1864b, p. 613, 659; Reprint, 1872, p. 99, 145; 1866, Feb., California Acad. Sci., Proc., vol. III, p. 221; REEVE, 1866, March, Conch. Icon., *Eulima*, vol. 15, pl. V, fig. 37; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1870, Amer. Jour. Conch., vol. VI, p. 67; TRYON, 1886, Man. Conch., vol. VIII, p. 279, pl. 70, fig. 68 copy REEVE; VANATTA, 1899, Acad. Nat. Sci., Philadelphia, Proc., vol. 51, p. 257, pl. XI, figs. 5, 6

*Melanella* (*Melanella*) *rutila* (Carpenter), BARTSCH, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2207, p. 306, pl. 35, figs. 2 (type), 3, 6

*Melanella rutila* (Carpenter), OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 109

*Melanella rutila* (Carpenter), DALL, 1921, p. 118 section *Eulima* OLDROYD, 1927, vol. II, pt. II, p. 75, pl. 46, figs. 2 (type), 3, 6 copy BARTSCH, 1917, section *Eulima*; GRANT AND GALE, 1931, p. 863; BAILY, 1935, West Coast Shells (KEEP), p. 182 subgenus *Eulima*; KEEN, 1937, p. 40

*Balcis rutila* (Carpenter), BURCH, 1945, no. 53, p. 6, 8, 10; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 192; BERRY, 1954, Bull. Amer. Paleont., vol. 35, no. 151, p. 4

"Leiostracoid, rosy, base lengthened. Like *producta*, Maz. Cat. no. 551." [Carpenter, 1864b, p. 659]

Oldroyd (1927) republished Carpenter's description (1866). The following changes should be made in her copy:

Line 1: read "tereti" for "terte;" line 3: delete "supra suturam retrorsum" and insert in place "et apertura valde prolongatis."

Add:

". . . div. 20°.

"*Hab.* Monterey; Cooper.

"Closely allied to *Leiostraca producta*, Cpr. Maz. Cat. no. 551, but displays no varices. The Eulimidae are very difficult to distinguish, from a few shells alone." [Carpenter, 1866a, p. 221]

Bartsch gave a complete discussion and illustration of the shell of this species. The holotype is labelled "Monterey."

*Dimensions*.—Length 6.8 mm.; diameter, 1.9 mm. (holotype, Bartsch).

*Holotype*.—U. S. National Museum, no. 14928

*Distribution*.—Recent. Monterey, California (type); Forrester Island, Alaska, to Magdalena Bay, Lower California (Burch). Pleistocene. California (Bartsch; Berry)

#### *Balcis thersites* (Carpenter)

*Eulima Thersites* CARPENTER, 1864b, p. 537, 659 small "t"; Reprint, 1872, p. 23, 145; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 396; Reprint 1872, p. 286; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1870, Amer. Jour. Conch., vol. VI, p. 67; TRYON, 1886, Man. Conch., vol. VIII, p. 278

*Eulima thersites* VANATTA, 1899, Acad. Nat. Sci. Philadelphia, Proc., vol. 51, p. 255

*Eulima lowei* VANATTA, 1899, Acad. Nat. Sci. Philadelphia, Proc., vol. 51, p. 254, pl. XI, figs. 9, 10 *vide* BARTSCH, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2207, p. 323

*Eulima bistorta* VANATTA, 1899, Acad. Nat. Sci. Philadelphia, Proc., vol. 51, pl. XI, figs. 7, 8 *vide* BARTSCH, 1917

*Melanella (Balcis) thersites* (Carpenter), BARTSCH, 1917, U. S. Nat. Mus., Proc., vol. 53, no. 2207, p. 323, pl. 41, figs. 1-3 (2 types); DALL, 1921, p. 117; OLDROYD, 1927, vol. II, pt. II, p. 70, pl. 47, fig. 2 type copy BARTSCH, 1917, also *E. lowei* fig. 1 and *bistorta* fig. 3 types

*Melanella thersites* (Carpenter), GRANT AND GALE, 1931, p. 862; BAILY, 1935, West Coast Shells (KEEP), p. 181 and subspecies *bistorta* Vanatta; KEEN, 1937, p. 40

*Balcis thersites* (Carpenter), BURCH, 1945, no. 53, p. 7, 9; SMITH AND GORDON, 1948, California Acad. Sci., Proc., vol. XXVI, no. 8, p. 192

*Balcis (Vitreolina) thersites* (Carpenter), BERRY, 1954, Bull. Amer. Paleont., vol. 35, no. 151, p. 4

"Very broad, short, twisted." [Carpenter, 1864b, p. 659]

Oldroyd (1927) republished Carpenter's original description of this species. The following changes should be made in her copy:

Delete "poll."

Add:

". . . div. 40°.

"*Hab.* Sta. Barbara, 1 specimen (*Jewett*).

"Preeminent for aberration among the distorted Eulimidae. A second specimen occurred from an uncertain source." [Carpenter, 1865h, p. 396]

Bartsch fully discussed this species and illustrated the holotype. He also figured the types of *B. lowei* (Vanatta) and *B. bistorta* (Vanatta) which he regarded as synonymous with Carpenter's species. The holotypes of Vanatta's species are from Long Beach and Monterey, California, respectively.

The three forms as illustrated by their types show different degrees of flexing and thickness of the callus of the lips.

*Dimensions*.—Length 5.1 mm.; diameter 2.5 mm. (holotype, Bartsch)

*Holotype*.—U. S. National Museum, no. 11795

*Distribution*.—Recent. Santa Barbara, California (type); Monterey, California, to San Geronimo Island, Lower California (Dall). Pleistocene. California (Oldroyd, 1925; Grant and Gale; Berry); Mexico (Jordan, 1926)

Genus *Cythnia*<sup>90</sup> Carpenter, 1864( *Cythnoa* Dall,<sup>91</sup> 1924, new name)*Cythnia* CARPENTER, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, June, p. 478 *Cythnia*; Reprint, 1872, p. 218Type species by monotypy, *C. asteriaphila* CARPENTER, 1864b, p. 478. Living. Lower California (Pl. 19, figs. 5, 5a)*Cythnia albida* Carpenter

(Pl. 19, figs. 3, 3a)

*Cythna albida* CARPENTER, 1864b, Aug., p. 613; Reprint, 1872, p. 99; 1866, California Acad. Sci., Proc., vol. III, p. 219*Cithna* [sic] *albida* CARPENTER, 1864b, p. 657; Reprint, 1872, p. 143 *Cythna* in index; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 31*Cythnia albida* (Carpenter), TRYON, 1886, Man. Conch., vol. VIII, p. 293; BURCH, 1945, no. 53, p. 14*Cythna albida* Carpenter, DALL, 1921, p. 119; OLDROYD, 1927, vol. II, pt. 2, p. 80; KEEN, 1937, p. 35"Very close to *C. tumens*, Maz. Cat. no. 421, but umbilicus angled, not keeled." [Carpenter, 1864b, p. 657]

Oldroyd (1927) reproduced part of Carpenter's description (1866). The following changes should be made in her copy:

Last line: read "pariete" for "partiete."

Add:

"Long. 0.03, long. spir. 0.015, lat. 0.025, div. 80°.

"Hab. San Pedro; in shell-washings. Cooper.

"Known from *C. tumens*, Maz. Cat. no. 421, by the non-keeling of the umbilicus." [Carpenter, 1866a, p. 219]The holotype is in the U. S. National Museum. It is on an original Carpenter glass mount in the original vial with the Carpenter label "'Type. Genus 15569 *Cythna albida* Cpr. S. Diego Cp."*Holotype*.—U. S. National Museum, no. 15569*Distribution*.—San Diego, California (type); Southern California; parasitic on starfishes (Dall)Family FOSSARIDAE<sup>92</sup>Genus *Iselica* Dall, 1918( *Isapis* H. and A. Adams, 1854)*Iselica* DALL, 1918, Biol. Soc. Washington, Proc., vol. 31, p. 137. New name for *Isapis* H. and A. ADAMS, 1854, Gen. Rec. Moll., vol. I, p. 320. Not *Isapis* DOUBLEDAY, 1847, see NEAVE<sup>93</sup> (1939-1940)Type species by monotypy *Isapis anomala* (C. B. ADAMS), 1850, Cont. Conch., no. 7, p. 109 as *Narica* ? Recent. West Indies. CLENCH AND TURNER, 1950, Occ. Pap. Moll., vol. I, no. 15, p. 256, pl. 39, fig. 14 lectotypeThe sculpture of *I. fenestrata* Carpenter is remarkably similar in detail to that of the type species of the genus.*Iselica fenestrata* Carpenter

(Pl. 21, figs. 15, 16)

*Isapis fenestrata* CARPENTER, 1864b, Aug., p. 613, 628, 656; Reprint, 1872, p. 99, 114, 142; 1864, Dec. Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 429; Reprint, 1872, p. 241; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; 1870, Amer. Jour. Conch., vol. VI, p. 64; KEEP, 1887, West Coast Shells, p. 65; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 206; ARNOLD, 1903, p. 304; DALL, 1921, p. 155, pl. 13, fig. 2; STRONG, 1923,<sup>90</sup> Spelling of Carpenter: *Cythnia* (1864a, June) *Cythna* (1864b, Aug.) "*Cythna* A. Adams," (1866). Spelling of Adams: *Cithna* (1863, p. 113).<sup>91</sup> Dall (1924, p. 89). The new name is not necessary.<sup>92</sup> Theile (1929), Wenz (1940), and Aguayo and Jaume (1949) placed *Iselica* as a subgenus of *Phasianema* S. Wood (1842) and in the family Pyramidellidae.<sup>93</sup> "*Isapis* Westwood, 1851," as quoted by Dall is not in Neave (1939-1940). The result is the same.

*Nautilus*, vol. 37, no. 2, p. 43; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 151; 1927, pt. III, p. 70, pl. 31, fig. 6 same as DALL, 1921; GRANT AND GALE, 1931, p. 783; BAILY, 1935, West Coast Shells (KEEP), p. 201; KEEN, 1937, p. 37; BURCH, 1945, no. 55, p. 16, 18; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 65, pl. 34, fig. 5. Pleistocene; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196

*Fossarus fenestrata* (Carpenter), TRYON, 1887, Man. Conch., vol. IX, p. 272, pl. 52, fig. 11 section *Isapis*

"Like *ovoidea*, with sharp distant ribs." [Carpenter, 1864b, p. 656]

Oldroyd (1927) included part of Carpenter's description (1864d) of this species. However, through typographical errors so much of the Latin description was omitted that it seems best to copy here the entire description:

"I. testa *I. ovoideae* forma et indole simili; carinis IX. acutis (quarum IV. in spira monstrantur) cincta, interstitiis duplo latioribus, concinne quadratum decussatis, lirulis radiantibus acutissimis; anfr. postice tumetibus, suturis valde excavatis; peritremate continuo, labro a carinis pectinato; labio parietem parum attingente, medio calloso; umbilico angusto. Long. .18, long. spir. .13, lat. .19, div. 70°.

"Hab. Neeah Bay (*Svan*); S. Diego and Sta. Barbara Island (*Cooper*).

"Dr. Cooper's shells are much smaller than those from the Vancouver district, which are white and eroded, varying much in the size of the umbilicus." [Carpenter, 1864d, p. 429]

The type material includes three specimens labelled "Sta. Barbara and S. Diego." These are obviously the specimens collected by Cooper. They are not segregated so that one cannot stipulate the type locality. But it makes the California area the type locality in place of that mentioned first in the expanded description.

*Dimensions*.—Height 5+ mm.; greatest diameter 3.5 mm. (largest specimen); height 3 mm.; greatest diameter 2.5 mm. (smallest specimen)

*Syntypes*.—U. S. National Museum, nos. 15772 and 15775

*Distribution*.—Recent. Santa Barbara and San Diego, California (type); Puget Sound to the Gulf of California (Dall). Pleistocene, California (Arnold; Oldroyd, 1925; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew, 1946)

### *Iselica obtusa* (Carpenter)

(Pl. 21, figs. 17, 18)

*Isapis obtusa* CARPENTER, 1864b, p. 613, 656; Reprint, 1872, p. 99, 142; 1866, California Acad. Sci., Proc., vol. III, p. 217; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 29; 1870, Amer. Jour. Conch., vol. VI, p. 64; KEEP, 1887, West Coast Shells, p. 65; DALL, 1921, p. 155; OLDROYD, 1927, vol. II, pt. III, p. 71; BAILY, 1935, West Coast Shells (Keep), p. 201; KEEN, 1937, p. 37; BURCH, 1945, no. 55, p. 16, 18; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 196

*Fossarus obtusus* (Carpenter), TRYON, 1887, Man. Conch., vol. IX, p. 273, pl. 52, fig. 12

"Whirls [*sic*] flattened behind: ribs swollen, uneven. 10–20 fm. *Cp.*" [Carpenter, 1864b, p. 656]

Oldroyd (1927) republished a copy of Carpenter's description (1866). The following changes should be made in her copy:

Delete "poll."

Add:

"... State Collection, no. 682."

"... Div. 60°.

"Hab. S. Diego, 10 fm.; Sta. Barbara, 20 fm.; *Cooper*.

"The fortunate discovery of some perfect young specimens displays a nucleus so like *Odosstomia* that, despite the resemblance of the shell to *Fossarus*, which has a tuberoïd nucleus, it most probably belongs to *Pyramidellidae*." [Carpenter, 1866, p. 217]

The syntypes consist of four specimens with a label "10 fm. San Diego Cooper Cotype."

The specimens collected by Hanham (1911, p. 112–114) at Maple Bay, Vancouver Island, were described as the new variety *I. obtusa laxa* by Dall (1919c, p. 351).

*Syntypes*.—U. S. National Museum, no. 14814 [14936]

*Distribution*.—San Diego, California (type); Puget Sound, Washington, to San Diego, California (Burch); Hanham, (1911) for habitat of *I. obtusa laxa* Dall).

## Family HIPPONICIDAE

Genus *Hipponix*<sup>94</sup> DeFrance, 1819

(Amalthea Schumacher, 1817 non Rafinesque, 1815)

*Hipponix* DEFRANCE, 1819, J. Physique, Chimie, Hist. nat., t. 88, Jan., p. 217, figs. 1, a-fType species by subsequent designation, ANTON, 1839, Ver. Conchyl., p. 28, *Paiella cornucopiae* LAMARCK, 1802, Ann. Mus. Nat. Hist. Nat., t. 1, p. 311; Eocene, Paris Basin. COSSMANN AND PISSARRO, 1910-1913, Icon. comp. Coq. foss. Éocène Env. Paris, t. 2, pl. XII, figs. 74-1*Hipponix tumens* Carpenter

(Pl. 21, figs. 1-3)

*Hipponix tumens* CARPENTER, 1864b, p. 537, 541, Monterey, identification questioned, 654; Reprint, 1872, p. 23, 27, 140; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 180; Reprint, 1872, p. 282; COOPER, 1867 Geog. Cat. Moll., Geol. Sur. California, p. 27 *Hipponyx*; TRYON, 1886, Man. Conch., vol. VIII, p. 135, not pl. 40, fig. 7; KEEP, 187, West Coast Shells, p. 75 *Hipponyx*; ARNOLD, 1903, p. 313; DALL, 1921, p. 161; STRONG, 1923, Nautilus, vol. 37, no. 2, p. 43; OLDROYD, 1927, vol. II, pt. III p. 113; Grant and Gale, 1931, p. 788 see for additional references; SNOOK AND JOHNSON, 1935, Seashore Animals, p. 536, fig. 596; BAILY, 1935, West Coast Shells, (Keep), p. 189; KEEN, 1937, p. 37; BURCH, 1946, no. 56, p. 10, 11; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 70; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197*Capulus tumens* (Carpenter), COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 64*Amalthea tumens* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 204*Hipponix subrufus tumens* Carpenter, ABBOTT, 1954, p. 166"Growth like *Helcion*: sculpture more open than *barbatus*." [Carpenter, 1864b, p. 654]

The above description was based on material from Monterey, San Diego, San Pedro, and Santa Barbara Islands.

The following corrections and additions should be made to the copy of Carpenter's description (1865) as published by Oldroyd (1927) to make that copy complete:

Line 1: read "rotundata" for "rotundara;" page 114, line 1: read "incrementi" for "incremente;" line 3: read .7 for 7; .46 for 46; .33 for 33; delete "poll."

Add:

"div. 90°

"Hab. Sta. Barbara (*Jewett*); S. Pedro (*Cooper*)."= '*H. ? subrufa*' + '*Capulus*, 213', Brit. Assoc. Rep. 1857, p. 230." [Carpenter, 1865h, p. 180]

The type material consists of four specimens in the U. S. National Museum labelled, "San Diego Monterey Sta. Barbara." Largest specimen is figured herein.

Apparently the four specimens were concentrated under the no. 14929 without differentiating the locality of each specimen. The back of the present label bears numbers 14817b, 15293, 15652, 15715. It is, therefore, impossible to stipulate the exact locality of a lectotype. Oldroyd mentioned Santa Barbara, probably because it is mentioned first in the description (1865). Woodring, Bramlette, and Kew (1946) stated that the four specimens above came from Monterey. However, from the condition of the syntypes a selection of type locality would have to be arbitrary.

*Dimensions, syntypes*.—Greatest length from umbo to aperture 18 mm.; height 8 mm.; greatest diameter of aperture 12 mm. (largest); greatest length 5 mm.; height 2 mm.; greatest diameter 5 mm. (smallest).*Syntypes*.—U. S. National Museum, no. 14929 (14817b, 15293, 15652, 15715)*Distribution*.—Recent. San Diego, Monterey, Santa Barbara Island, (type; syntypes are not separated as to exact locality of each); Crescent City, California, to Clarion Island [Revillagigedo Islands] (Burch). Pleistocene. California (Arnold; Chace, 1919; Oldroyd, 1925; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew); Mexico (Jordan, 1926; Hertlein, 1934)<sup>94</sup> The original spelling is *Hipponix*. *Hipponyx* DeFrance (Blainville, 1819, p. 9) is only a notice of the original article, *vide* Smith (1906, p. 123).

**Hipponix antiquatus cranioides** Carpenter

(Pl. 21, figs. 4-6)

*Hipponyx cranioides* CARPENTER, 1864, Aug., p. 268, 654; Reprint, 1872, p. 114, 140; 1864, Dec., Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 427; Reprint, 1872, p. 239; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 27; TRYON, 1886, Man. Conch., vol. VIII, p. 135, pl. 40, fig. 6; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 244; ARNOLD, 1903, p. 312; BAILY, 1935, West Coast Shells (Keep), p. 189; KEEN, 1937, p. 37; BURCH, 1956, no. 56, p. 10, 11

*Amalthea cranioides* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 204

*Hipponix antiquatus cranioides* (Carpenter), DALL, 1921, p. 161; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 158; 1927, vol. II, pt. III, p. 113; GRANT AND GALE, 1931, p. 788; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 70; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197 doubtful var.

"Large, rough, flat, intermediate between *planatus* and *H. antiquatus* . . ." [Carpenter, 1864b, p. 654]

The following corrections should be made in the copy of the Carpenter's description (1864d) published by Oldroyd (1927)

Line 5: read "contiqua" for "continua;" read .85 for 85; .75 for 75; .3 for 3; delete "poll."

Add:

"*Hab.* Neeah Bay (*Swan*)."

The type material consists of 15<sup>95</sup> specimens, all irregular in shape; some are flattish, others are high, and the majority are irregularly round. The specimen herein illustrated is a medium-flat shell which has the radiating striae developed best of all the specimens.

Many workers do not regard this form as of subspecific rank. It is retained here to formulate the original data of the name *cranioides* more concisely.

*Types*.—Syntypes, U. S. National Museum, no. 15508 (label no. 15508Q; specimens 15508)

*Distribution*.—Recent. Neah Bay, Washington (type); Vancouver Island, to San Pedro, California (Dall). Pleistocene. California (Cooper; Arnold; Oldroyd, 1925; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew; Keen *in* Cockerell, 1939)

**Hipponix serratus** Carpenter<sup>96</sup>

*Hipponyx serratus* CARPENTER, 1857, Cat. Mazatlan Shells, p. 296; 1864b, p. 541, 612 Santa Barbara Is., 654; Reprint, 1872, p. 27, 98, 140; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 27 "Santa Barbara south—Mazatlan" TRYON, 1866, Man. Conch., vol. VIII, p. 134, pl. 40, fig. 100

*Hipponyx antiquatus* Linnaeus, COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 64 includes "*serratus* Cpr.?" "Monterey south?—S. America, Atlantic."

? *Amalthea serrata* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 892, p. 204 "San Pedro."

*Hipponix serratus* Carpenter, DALL, 1921, p. 161 "Monterey to Panama"; OLDROYD, 1927, vol. II, pt. III, p. 113 Latin only of original description "Monterey to Panama"; KEEN, 1937, p. 37 "lat. 8-37"; BURCH, 1946, no. 56, p. 9, 10 "Moss Beach," Calif.; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 197 doubted Monterey record

This species was described from Mazatlan. The illustration and discussion are reserved for the work on that fauna. The synonymy is not intended to be complete, except to point out references where the species has been recorded from Monterey. Some of the records are compilation and do not include original findings. Smith and Gordon doubt its existence at Monterey.

*Holotype*.—Probably in British Museum (Natural History) where the types were deposited

<sup>95</sup> Woodring (Woodring, Bramlette, and Kew, 1946) gave the number as 44.

<sup>96</sup> In Burch (1946, p. 9) *H. serratus* "Sowerly" seems to be a typographical error for "Carpenter."

## Family CALYPTRAEIDAE

Genus *Calyptraea* Lamarck, 1799<sup>97</sup>

*Calyptraea* LAMARCK, 1799, Soc. Hist. Nat. Paris, Mem., tab. facing p. 70, *Calyptraea*; no. 54, p. 78 *Calyptroea*

Type species by monotypy, *Patella chinensis* LINNAEUS, 1758, Syst. Nat., p. 781. Recent. England through the Mediterranean. Fossil. TRYON, Man. Conch., 1886, vol. VIII, pl. 34, figs. 56, 57

*Calyptraea contorta* (Carpenter)

(Pl. 21, figs. 13, 14)

*Galerus contortus* CARPENTER, 1864b, p. 590, 612, 654; Reprint, 1872, p. 76, 98, 140; 1866, California Acad. Sci., Proc., vol. III, p. 215; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 27; 1888, 7th Ann. Rept. California State Min., p. 241

*Calyptraea contorta* (Carpenter), TRYON, 1886, Man. Conch., vol. VIII, p. 121; DALL, 1921, p. 163; STRONG, 1925, Nautilus, vol. 39, no. 1, p. 11; OLDROYD, 1927, vol. II pt. III, p. 114; KEEN, 1937, p. 32; BURCH, 1946, no. 56, p. 19, 21; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 198

"Whirls twisted: nucleus minute, prominent. 20-40 fm. *Cp.*" [Carpenter, 1864b, p. 654]

The following lines should be added to Carpenter's description (1866) as published by Oldroyd (1927) to make that copy complete:

" . . .

" . . . State Collection, no. 369.

"*Hab.* Monterey, 20-40 fm., Santa Barbara, 16-20 fm.; Catalina Island, 30-40 fm.; *Cooper.*

"The vertex stands out like a tiny Planorbis, and is more minute than in any species I have examined." [Carpenter, 1866a, p. 215]

The single remaining specimen of the original lot is from the third locality mentioned by Carpenter. The type has a label "Type Catalina Is. Cooper." The type locality is, therefore, Catalina Island instead of Monterey as indicated by Smith and Gordon.

*Lectotype*.—U. S. National Museum, no. 11846

*Distribution*.—Recent. Catalina Island, California (type); Catalina Island, California, to Gulf of California (Dall). Pleistocene. California (Cooper; Willett, 1937)

Genus *Crepidula* Lamarck, 1799*Crepidula onyx* Sowerby

"*Crepidula rugosa* Nutt. ms." Carpenter

(Pl. 14, fig. 6)

*Crepidula onyx* SOWERBY, 1825, Genera of Shells, no. 23, fig. 2

*Crepidula rugosa* Nutt. [ms.] JAY, 1852, Cat. Shells, Cat. Shells, 4th ed., p. 107 under *C. onyx* Sowerby; CARPENTER, 1856, Zool. Soc. London, Proc., pt. XXIV, p. 224; 1857, Rept. Brit. Assoc. Adv. Sci. 1856, p. 200, 323, 349; 1857, Mazatlan Cat., p. 278, 279; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 4; 1864, p. 537, 541, 565, 654; Reprint, 1872, p. 23, 27, 51, 140; TRYON, 1886 Man. Conch., vol. VIII p. 128 under *C. onyx*; BURCH, 1945, no. 56, p. 13 under *C. onyx* Sowerby

Jay assigned Nuttall's manuscript name to *C. onyx* Sowerby where it remains. Carpenter, however, described the Nuttall shell from "upper California" although he was not certain that its difference from *C. onyx* merited specific rank. He thought (1864b) it might be a northern "variety" of *C. onyx*.

A photograph of the interior of the type of "*C. rugosa* Nuttall" ms. is included herein through the courtesy of the British Museum (Natural History). Mr. Wilkins sent the following notes which are the label on the type:

"*Crepidula rugosa* Nuttall. U. Calif. (Nuttall label)."

<sup>97</sup> Sum. Opinion Rend., no. 94, Int. Rules Zool. Nomen., Smithsonian Misc. Coll., vol. 73, no. 4, 1926, p. 12, *Calyptraea* Lamarck, 1799, mt., *Patella chinensis* Linnaeus, placed in the Official List of Generic Names.

## Family NATICIDAE

Genus *Natica* Scopoli, 1777"*Natica* ? *Maroccana*, var. *Californica*" Carpenter*Natica* ? *Maroccana*, var. *Californica* CARPENTER, 1856, Zool. Soc. London, Proc., pt. XXIV, p. 227; 1864b, p. 527; Reprint, 1872, p. 13

Carpenter described this shell (1856) from "upper California," but he later (1864b) wrote, "The varietal name must be dropped. The shell certainly came from the Sandwich Islands."

## Family VELUTINIDAE

Genus *Velutina* Fleming, 1820*Velutina* FLEMING, 1820,<sup>98</sup> Brewster's Edinburgh Encycl., vol. XIV, pt. 2, p. 626; 1832, 1st Amer. Ed., vol. XIII, pt. 2, p. 684Type species by original designation, monotypy, and obsolete tautonymy, *Bulla velutina* MÜLLER, 1776, Zool. Danica, p. 242 = *V. vulgaris* Fleming = *Helix laevigata* of British authors *vide* Fleming. Recent. Northern Europe; North Atlantic to Massachusetts; north Pacific to Monterey, California. TRYON, 1886, Man. Conch., vol. VIII, pl. 28, figs. 41-44, 48, 59*Velutina prolongata* Carpenter

(Pl. 21, figs. 7, 8)

*Velutina prolongata* CARPENTER, 1864b, p. 628, 661; Reprint, 1872, p. 114, 147; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 32; Reprint, 1872, p. 245; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 35; TRYON, 1886, Man. Conch., vol. VIII, p. 66; Dall, 1921, p. 167; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 164; 1927, vol. II, pt. III, p. 140; KEEN, 1935, p. 49; Burch, 1946, no. 57, p. 3; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 199 Monterey doubtful record.

"Spire very small. Labrum produced in front." [Carpenter, 1864b, p. 661]

The following corrections and additions should be made in Oldroyd's (1927) copy of Carpenter's description (1865):

Line 2: read "dimidio" for "imidio"; read .1 for 1; read .15 for 15; delete "poll."

Add:

"... div. 140°.

"*Hab.* Neeah Bay; rare (*Swan*)." [Carpenter, 1865a, p. 32]

There are four specimens in the type collection which are labelled, "Neeah Bay Washington J. G. Swan." The specimen of the four which is figured herein is the best preserved and next to the largest of the group.

*Dimensions, Syntypes*.—Length 24 mm.; width 19 mm.; height 11 mm. (largest); length 9 mm.; width 7 mm.; height 4 mm. (smallest)*Syntypes*.—U. S. National Museum, no. 11842*Distribution*.—Neeah Bay, Washington (type); Bering Strait to Monterey,<sup>99</sup> California (Dall)

## Family MURICIDAE

Genus *Ocenebra* Leach (ms.) in Gray, 1847(*Ocenebra* Leach, 1852, error for *Ocenebra* Gray, 1847)*Ocenebra* LEACH ms. in GRAY, 1847, Oct., Ann. Mag. Nat. Hist., vol. 20, p. 269; 1847, Nov., Zool. Soc. London, Proc., p. 133; WINCKWORTH, 1934, Jour. Conch., vol. 20, p. 14Type species by monotypy *O. erinacea* [Linnaeus] (MONTAGU), 1803, Test. Britannica, pt. I, p. 259 as *Murca* = *O. erinacea* (LINNAEUS), 1758, Syst. Nat., p. 748; 1767, p. 1216. Recent. Europe. TRYON, 1880, Man. Conch., vol. II, pl. 36, figs. 400-404*Ocenebra interfossa* Carpenter

(Pl. 23, fig. 1)

*Ocenebra interfossa* CARPENTER, 1864b, p. 603, 606, 628, 663; Reprint, 1872, p. 89, 92, 114, 149; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 64; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 37; 1870, Amer. Jour. Conch., vol. VI, p. 69; KEEP, 1887, West Coast Shells, p. 24, fig. 5; COOPER, 1888, 7th Ann. Rept. California State Min., p. 254; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 215; ARNOLD, 1903, p. 255<sup>98</sup> (Sherborn, 1937, p. 112)<sup>99</sup> Doubtful record (*vide* Smith and Gordon, 1948)



*Murex (Ocinebra) interfossa* (Carpenter), TRYON, 1880, Man. Couch., vol. II, p. 131, pl. 39, fig. 484

*Tritonalia interfossa* (Carpenter), DALL, 1921, p. 108, pl. 11, fig. 8; OLDROYD, 1927, vol. II, pt. II, p. 21, pl. 30, fig. 2 same fig. as DALL, 1921; GRANT AND GALE, 1931, p. 710; BAILY, 1935, West Coast Shells (Keep), p. 237, fig. 233; KEEN, 1937, p. 47

*Ocenebra interfossa* Carpenter, BURCH, 1945, no. 51, p. 48, 52, 53; BORMANN, 1946, Nautilus, vol. 60, no. 2, p. 38, pl. 4, figs. 10-11, 14; 1947, Minutes Conch. Club So. California, no. 71, p. 7; SMITH AND GORDON, California Acad. Sci., Proc. ser. 4, vol. XXVI, p. 189; ABBOTT, 1954, p. 216, fig. 49a same fig. as DALL, 1921

"Purple-brown, with latticed sculpture." [Carpenter, 1864b, p. 663, Monterey, Farallones, Puget Sound, and Vancouver area]

"O. t. satis elongata, purpureo—fusca; anfr. nucleosis ii, laevibus, elongatis; anfr. normalibus v. convexis, suturis valde impressis; costis radiantibus subvaricosis circ. XI, et spiralibus subaequantibus, quarum iii.-v. in spira monstrantur, decussata; interstitiis altis, quadratis, laminulis incrementi, et interdum costulis spiralibus obtusis intercalantibus, saepe ornatis; apertura ovata labro (t. adultâ) intus dentato; canali satis longa, saepius clausa. Long. .85, long. spir. 4, lat. .45, div. 60°.

"Hab.—Neeah Bay, Swan: Vancouver, Lord, (named *Fusus orpheus*, as of Gld. in Br. Mus.)" [Carpenter, 1865e, p. 64]

Specimen no. 4636 (14889 R132), U. S. National Museum, is labelled, "Type Monterey Harbor." It is the specimen which Bormann (1946) figured and of which an illustration is included herein. The writer does not believe that the facts warrant saying (as Bormann stated, Burch, 1947, no. 71, p. 7), that the type was figured in Dall (1921) and repeated in Oldroyd (1927). The explanation of that figure reads, "typical," and the drawing, which may be a composite sketch, does not depict the exact features of the "type."

Carpenter unconsciously bequeathed an error in the matter of the type locality. In his first brief description (1864b), Carpenter included shells from Monterey, Farallones, and the Strait of Juan de Fuca. However, in the complete description (1865), the California localities are not mentioned.

To be able to validate the above-labelled type (no. 4636, U. S. National Museum), Carpenter's earlier description (1864) must be accepted as adequate. Those brief lines are hardly complete. If the specific description dates from 1865 it is not consistent to have a holotype or lectotype from a locality which is not mentioned in that description.

J. Wyatt Durham informed the writer that there are in the Department of Paleontology, University of California, two specimens (not the same species), no. 47-402, labelled *Tritonalia interfossa*, which apparently had been segregated because they might be types. The writer doubts their status as types because of the absence of authentic type label. The lack of locality label would eliminate those specimens from availability as "lectotype."

The specimen, U. S. National Museum no. 4636, is the only "type" so far found. In spite of the inconsistency of its locale it would seem best to assume that the selection was made by Carpenter; therefore, the specimen is a holotype.

*Holotype*.—U. S. National Museum, no. 4636

*Distribution*.—Recent. Monterey, California (type); Semidi Island, Alaska, to Punta Santo Tomas, Lower California (Burch). Pleistocene. California (Arnold; Grant and Gale; Oldroyd, 1925; Woodring, Bramlette and Kew, 1946). Mexico (Jordan, 1926). Pliocene. California (Berry, 1809; Grant and Gale); Oregon (Howe, 1922; Grant and Gale). ?Miocene. Oregon (Howe, 1922; Grant and Gale)

### *Ocenebra interfossa atropurpurea* Carpenter

(Pl. 23, figs. 2, 3, 3A, 13)

*Ocenebra interfossa atropurpurea* CARPENTER, 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 64; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 37

*Tritonalia interfossa atropurpurea* (Carpenter), DALL, 1919, U. S. Nat. Mus., Proc., vol. 56, no. 2295, p. 334 as new variety; 1921, p. 108; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 100; 1927, vol. II, pt. II, p. 22; KEEN, 1937, p. 47

*Ocenebra interfossa atropurpurea* (Carpenter), BURCH, 1945, no. 51, p. 49; BORMANN, 1946, Nautilus, vol. 60, no. 2, p. 39, pl. 4, figs. 7-9; 1947, Minutes Conch. Club So. California, no. 71, p. 7 With description of *O. interfossa* Carpenter (1865e)

"Hab. Neeah Bay, Swan: Vancouver, Lord . . .

[Habitat for both *O. interfossa* and var. *atropurpurea*]

"Variat. : t. *atropurpurea*; costis spiralibus distantibus, in spirâ duabus, foveis majoribus. Variat quoque t. albido zonatâ." [Carpenter, 1865e, p. 64]

This subspecies was described as above by Carpenter (1865). Apparently Dall forgot about the description when he made the statement (1919) that a description had not been published by Carpenter. Dall's notes were no more complete than Carpenter's, so that Dall's name does not apply as author of the subspecies. The lectotype is figured herein for the first time. Bormann figured a specimen (1946) from White's Point, Los Angeles County, California, which had been compared with the holotype by Rehder (*in* Bormann, 1946).

There are seven specimens (paratypes) in the original group in the U. S. National Museum, no. 15528b<sup>100</sup> other than the one labelled "type." The label includes "Neeah Bay." The type is evidently a lectotype selected by Dall.

All the specimens, lectotype and paratypes, have the apical whorls worn. The suite includes young and mature individuals. Some are more slender than the "type," but all have the coarse longitudinal lines of growth and deep squarish pits. The labrum is not thickened on the immature forms.

The measurements which Dall gave (1919) are not those of the lectotype but of a more elongate shell (see size of lectotype, explanation of pl. 23, figs. 2, 3A)

*Lectotype*.—U. S. National Museum, no. 15528b

*Distribution*.—Neeah Bay, Washington (type); Neeah Bay, Washington, to San Diego, California (Dall)

#### *Ocenebra interfossa beta* (Dall)

*Tritonalia interfossa beta* DALL, 1919, Biol. Soc. Washington, Proc., vol. 32, p. 250 and *T. interfossa alpha* DALL, 1921, p. 108, pl. 13, fig. 9, as of CARPENTER in DALL, 1919 and 1921; T. S. OLDROYD, 1925, U. S. Nat. Mus., Proc., vol. 65, no. 2535, p. 12; I. OLDROYD, 1927, p. 22; GRANT AND GALE, 1931, p. 710; BURCH, 1945, no. 51, p. 48 as *Ocenebra*; named by Dall from manuscript names, probably museum labels, of Carpenter.

The subspecies were never mentioned in literature by Carpenter.

The holotype of *O. beta* was figured by Bormann (1946, pl. 4, fig. 15). *O. interfossa minor* was also a manuscript museum label name used by Carpenter. It was described by Dall (1919, p. 334) but not illustrated. Bormann (1946, Pl. 4, fig. 5) figured the holotype. *O. beta* Dall was also figured by Smith and Gordon (1948, holotype, Fig. 1, p. 189).

#### *Ocenebra lurida munda* Dall *in* Williamson

*Ocenebra lurida* var. *munda* CARPENTER, 1864b, p. 663; Reprint, 1872, p. 149; DALL *in* WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 215, pl. XX, fig. 3; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 37; 1870, Amer. Jour. Conch., vol. VI, p. 69; ARNOLD, 1903, p. 258

*Murex (Ocenebra) luridus munda* (Carpenter), TRYON, 1880, Man. Conch., vol. II, p. 131 *Tritonalia lurida munda* (Carpenter), DALL, 1921, p. 107; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 100; 1927, vol. III, pt. 11, p. 18; GRANT AND GALE, 1931, p. 712, pl. 32, fig. 5; BAILY, 1935, West Coast Shells (KEEP), p. 238, fig. 235 same as WILLIAMSON, KEEN, 1937, p. 47 *T. munda*

*Ocenebra lurida munda* Carpenter, BURCH, 1945, no. 51, p. 46; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 189

"Tall, with faint sculpture."—[Carpenter, 1864b, p. 663]

The above are the brief remarks which constitute the only data that Carpenter published on the subspecies, except the names of numerous localities from California and Vancouver

<sup>100</sup> The no. 155286 in Dall (1919, p. 334) is not correct. The "6" is a typographical error for "b."

Island which were not definitely segregated from that of the species. The first sentence of the notes which Oldroyd (1927, p. 18) credited to Carpenter are not those of Carpenter. They are a portion of Tryon's (1880, p. 131) remarks regarding the form.

Carpenter's line does not seem adequate to validate the subspecific name. Carpenter's type has not been found. The first to use the name with a figure, a type, and definite locality was Williamson. Therefore, if the form deserves subspecific rank, to preserve the name one must date it from Williamson. The identification of the form in her report was made by Dall.

*Lectotype*.—U. S. National Museum, no. 46708 (Williamson)

*Distribution*.—Recent. Catalina Island, California (type); Middleton Island, Alaska, to San Diego, Calif. (Dall). Pleistocene. California (Arnold; Grant and Gale; Woodring, Bramlette and Kew, 1946)

### *Ocenebra poulsoni* Carpenter

(Pl. 26, fig. 8)

*Buccinum Poulsoni* "Nutt. M. S.," CARPENTER, 1856, Zool. Soc. London, Proc., p. 227 "Upper California. Mus. Nuttall."

*Ocenebra Poulsoni* Nuttall, CARPENTER, 1864b, p. 537, 663, 665; Reprint, 1872, p. 23, 149, 151; 1865, Jour. de Conchyl., vol. XIII, ser. 3, vol. V, p. 148; Reprint, 1872, p. 316; KEEF, 1887, West Coast Shells, p. 23; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 215; ARNOLD, 1903, p. 260, pl. V, fig. 2

*Ocenebra Poulsoni* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 38

*Murex (Ocenebra) Poulsoni* Nuttall, TRYON, 1880, Man. Conch., vol. II, p. 130, pl. 38, fig. 475

*Tritonalia poulsoni* (Carpenter), DALL, 1921, p. 107; OLDROYD, 1927, vol. II, pt. II, p. 19

*Tritonalia poulsoni* (Nuttall in Carpenter), GRANT AND GALE, 1931, p. 712, pl. 32, fig. 10; KEEN, 1937, p. 47

*Tritonalia poulsoni* (Nuttall), BAILY, 1935, West Coast Shells (KEEF), p. 238

*Ocenebra poulsoni* (Carpenter), BURCH, 1945, no. 51, p. 47; ABBOTT, 1954, p. 218, pl. 24, fig. K

"Shape like *M. monoceros*, with brown spiral lines." [Carpenter, 1864b, p. 663]

Oldroyd (1927) republished the Latin portion of Carpenter's (1865) description.

The following changes should be made in her copy:

Line 6: for "lumentibus" read "tumentibus," add "div. 38" at end of line.

Add:

"Hab. San Diego, Nuttall.—Cerro Is., Veatch.—Santa Barbara, Jewett.

"Je n'ai vu que trois individus de cette belle espèce: l'un d'eux, qui est typique, porte le nom de "*Buccinum Poulsoni*" dans la collection Nuttall qui fait partie du Musée britannique: un second, très-jeune, et d'un aspect fort particulier, bien qu'il appartienne évidemment à la même espèce, a été recueilli par le colonel Jewett, probablement à Santa Barbara (mais, d'après son étiquette, à Panama); enfin celui du docteur Veatch provient de la basse Californie, et il est en très-mauvais état. Le premier a été dessiné sur bois pour l'institution Smithsonianne par M. Sowerby. Comme cette espèce intéressante est presque inconnue en France, j'ai cru devoir en donner une description suffisamment précise." [Carpenter, 1865g, p. 149]

Carpenter's description (1864b) indicated specimens from "California" (Nuttall),"? Santa Barbara" (Jewett), and "Lower California" (Smith. Inst.). They were used as the basis of the analysis. Those three sources are identical with the three mentioned by Carpenter in his description (1865). Fortunately, the Nuttall (G. L. Wilkins, Mar. 2, 1951, personal communication) specimen is in the British Museum. The officials of that institution provided a photograph of the syntype ("holotype").

*Type*.—British Museum (Natural History), B. M. 61.5.18.22

*Distribution*.—Recent. San Diego, California (type); Santa Barbara, California, to Magdalena Bay, Lower California (Dall). Pleistocene. California (see Grant and Gale, 1931, p. 712); Mexico (Hertlein, 1934)

### *Ocenebra squamulifera* (Carpenter in Gabb)

*Trophon squamulifera* CARPENTER in GABB, 1869, Pal. California, vol. II, p. 44; TRYON, 1880, Man. Conch., vol. II, p. 139, pl. 31, fig. 320

- Ocenebra barbarentis* ARNOLD, 1903, p. 254, pl. V, fig. 1 not GABB, 1865, California Acad. Sci., Proc., vol. III, p. 183 *vide* WILLETT, 1938
- Tritonalia squamulifera* (Carpenter), DALL, 1921, p. 107; OLDROYD, 1927, pt. II, p. 18; KEEN, 1937, p. 47
- Tritonalia squamulifera* (Carpenter in Gabb), WILLETT, 1938, Nautilus, vol. 52, no. 1, p. 10; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 75, pl. 34, fig. 13
- Ocenebra squamulifera* (Carpenter), BURCH, 1945, no. 51, p. 46, 52; BORMANN, 1946, Nautilus, vol. 60, no. 2, p. 40, pl. 4, figs. 17, 18 holotype; BORMANN, 1947, Conch. Club. So. California, Min. no. 71, p. 8

"*T. satis turrita*, pallide rufosca; anfr. nucl.? norm. IV tabulatis, tumentioribus, suturis ad angulum 80°—100° acute impressis; costis rad. VI—VII vix varicosis, angustis, ad angulum posticum interdum spinosis, ad basin continuis; liris spiralibus primum iii fenestris dein creberrimis, asperis, squamulatis, interstitiis angustis, plus minusve incis, canali longiore, rectiore, duabus trientibus aperturae aequante, vix aperta; apertura ovali, labro incrassato, intus circ. V dentati; labio laevi, crassiore.

"Long. .9, long. spir. .35, lat. .51, div. 66°.

"Hab. Living; Catalina Isd.; Post-Pliocene, Sta. Barbara.

"With the general aspect of *T. tenuisculpta*, it is at once recognized by the difference in sculpture. The fossil (unique) specimen is much finer than the immature living one sent by Dr. Cooper. In this the varices are not spinous at the angle, and the spiral sculpture is stronger. The difference, however, does not appear to be specific." [Carpenter *in* Gabb, 1869, p. 44]

"The above description and notes were sent me by Dr. Carpenter, in a letter, and were based on a unique fossil specimen found by myself at Santa Barbara, and an immature recent one from Catalina Island, found by Dr. Cooper." [Gabb, 1869, p. 44]

J. Wyatt Durham (Personal communication) furnished the following notes in regard to the type of this species which is in the University of California, Museum of Paleontology:

"*Trophon squamulifer* Carpenter

"Univ. Calif. Mus. Paleo. no. 15459; marked Holotype; has old State Survey no. 63 on yellow gummed square; present label on box 10—15 years old; label in bottle older, but not too old: *Trophon squamulifera* Cpr. [Type]; back of label with measurements on it different writing than front. Label on box with notation: Carpenter, in Gabb, Pal. Calif., 1869, vol. 2, p. 44; Recent; Catalina Island, Calif.

"There is a possibility that the label in the bottle might be Rivers', but it certainly is not older than that, and might be younger."

This species was founded on two specimens, one from the Recent and one from the Pleistocene. Present workers seem to be in doubt whether the species occurs in the living fauna, because it has been assumed that the type was the Pleistocene shell.

However, if the label of the existing type is correct, the holotype (depending on whether it was originally selected by Carpenter) came from Catalina Island and is a Recent shell. Bormann (1946), in the explanation of the figure of the holotype, defined the shell from the "Pleistocene of Santa Barbara," but that is a confusion. Apparently the Pleistocene shell is not available.

If the holotype or lectotype is established on the Recent species and that is the locality which Carpenter mentioned first, the query by workers as to the presence of the species in the Recent fauna is settled. The problem would then be to identify living shells which may be at present classified under some other name. If the Pleistocene shells, heretofore called *T. squamulifera*, can be separated from the holotype of *T. squamulifera* as a distinct species or subspecies, the Pleistocene form would deserve a new name. Pleistocene (San Pedro sand) specimens which had been figured as "*Ocenebra barbarentis* Gabb" by Arnold have been assigned to this species by Willett. Woodring, Bramlette, and Kew agree with Willett in his identification.

Bormann (1946) figured the "holotype" of this species.

*Holotype (or lectotype)*.—University of California, Museum Paleontology, no. 15459

*Distribution*.—Recent. Catalina Island, California (type); Santa Barbara to San Pedro, California (Dall); British Columbia, to Santa Barbara, California (Burch, 1955). Pleistocene. California (Carpenter) Santa Barbara (Arnold, 1903; Willett, 1938; Woodring, Bramlette, and Kew)

**Ocenebra tenuisculpta** (Carpenter)

(Pl. 23, figs. 9-12)

*Trophon tenuisculptus* CARPENTER, 1864b, p. 539; Reprint, 1872, p. 25; 1866, Ann. Mag. Nat. Hist., ser. 3, vol. XVII, p. 275, 277; Reprint, 1872, p. 322, 324; not TRYON, 1880, Man. Conch., vol. II, p. 139, pl. 33, fig. 359 copy KOBELT, KÜSTER, Conch. Cab., t. 76. f. 9; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 268; not KEEN, 1937, p. 48

*Trophon (Boreotrophon) tenuisculptus* Carpenter, ARNOLD, 1903, p. 253

*Boreotrophon tenuisculptus* (Carpenter), DALL, 1902, U. S. Nat. Mus., Proc., vol. 24, no. 1264, p. 541 in part section *Trophonopsis*; VAN WINKLE [Palmer], 1921, Bull. Amer. Paleont., vol. VIII, no. 36, p. 5 copy of original description, pl. 1, figs. 6-9 types

Not *Neptunea tenuisculpta* (Carpenter), DALL, 1921, p. 111, pl. 11, figs. 11, 12; OLDROYD, 1927, vol. II, pt. 2, p. 39, pl. 30, figs. 3, 7 copy of DALL, 1921, pl. 11, figs. 11, 12 = *Trophon lasius* DALL, 1919, U. S. Nat. Mus., Proc., vol. 56, p. 338; WILLET, 1938, Nautilus, vol. 52, no. 1, p. 10, pl. 1, fig. 6 type

*Trophon (Trophonopsis) tenuisculptus* (Carpenter), GRANT AND GALE, 1931, p. 725 in part; *T. lasius* Dall

*Tritonalia tenuisculpta* (Carpenter), WILLETT, 1938, Nautilus, vol. 52, no. 1, p. 10

"*T. testa* T. Barvicensis simili, sed sculptura minus extante; vertice nucleoso minimo; anfractibus uno et dimidio laevibus, apice acuto; normalibus v., tumidis, postice subangulatis, suturis impressis; costis radiantibus x.-xiv., plerumque xii., haud varicosis, angustis, obtusis; liris spiralibus majoribus, distantibus, quarum ii.-iii. in spira monstrantur, aliis intercalantibus, supra costas radiantem undatim transeuntibus; tota superficie lirulis incrementi, supra liras spirales squamosis, eleganter ornata; canali longiore, subrecta, vix clausa; labro acutiore, postice et intus incrassto, dentibus circ. v. munito; labio conspicuo, laevi; columella torsa.

"Hab. Sta. Barbara, Pleistocene formation (*Jewett*).

"This very elegant shell is like the least-sculptured forms of *T. Barvicensis* from which it appears to differ in its extremely small nucleus. It is very closely related to *T. fimbriatulus*, A. Ad., from Japan, but differs in texture, and is regarded by Mr. Adams as distinct. It stands on the confines of the genus, there being a slight columellar twist, as in *Peristernia*." [Carpenter, 1866, p. 277]

*Dimensions*.—Length 16 mm.; greatest diameter 8 mm.; length 13 mm.; greatest diameter 7 mm. (syntypes)

There are two specimens of this species on the original card labelled "type." They are in the Paleontological Laboratory, Cornell University. The history of their preservation there is described by Van Winkle [Palmer] (1921).

Willett (1938) in consultation with Grant and Strong, showed that the Recent form which had commonly been determined by authors and labelled in collections as this species was in reality something different and is what Dall (1919) named *T. lasius*. *T. tenuisculpta* Carpenter is not in the Recent fauna.

*Syntypes*.—No. 4951, Paleontological Laboratory, Cornell University Ithaca, New York.

*Distribution*.—Santa Barbara formation. Pliocene-Pleistocene.<sup>101</sup> Santa Barbara, California (type); California (Arnold; Grant and Gale; Woodring, Bramlette, and Kew, 1946)

Genus **Trophonopsis** Bucquoy, Dautzenberg, and Dollfus, 1882

(*Boreotrophon* Fischer, 1884)

*Trophonopsis* BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1882, Moll. Marins du Roussillon, Gastropodes, t. I, p. 40

Type species by monotypy and original designation, *Murex muricatus* MONTAGU, 1803, Test. Brit., p. 262, pl. IX, fig. 2. Recent. Western Europe. TRYON, 1880, Man. Conch., vol. II, pl. 31, fig. 308. *Murex clathratus* LINNAEUS, 1867, Syst. Nat., p. 1223, type species of *Boreotrophon* FISCHER, 1884, Man. de Conchyl., pt. II, p. 640; TRYON, 1880, Man. Conch., vol. II, pl. 31, fig. 312

**Trophonopsis triangulatus** Carpenter

*Trophon triangulatus* CARPENTER, 1864b, p. 613, 663; Reprint, 1872, p. 99, 149; 1866, California Acad. Sci., Proc., vol. III, p. 224; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 38, 1888, 7th Ann. Rept. California State Min., p. 268; TRYON, 1880, Man. Conch., vol. II, p. 142; DALL, 1892, U. S. Nat. Mus., Proc., vol. 14, no. 849, p. 180, pl. V, figs. 1, 3 "type," 6

<sup>101</sup> Bailey (1935, p. 492-494) gave upper Pliocene-lower Pleistocene. Woodring, Bramlette, and Kew (1946, p. 104) gave lower Pleistocene.

- Trophon* (*Boreotrophon*) *triangulatus* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 216; ARNOLD, 1903, p. 254; GRANT AND GALE, 1931, p. 724
- Boreotrophon triangulatus* (Carpenter), DALL, 1902, U. S. Nat. Mus., Proc., vol. 24, no. 1264, p. 548 section *Austrotrophon*
- Boreotrophon peregrinus* DALL, 1902, U. S. Nat. Mus., Proc., vol. XXIV, no. 1264, p. 543
- Troponopsis triangulatus* (Carpenter), COSSMANN, 1903, Essais Pal. Comp., liv. 5, p. 54; BURCH, 1955, Min. Conch. So. California, no. 149, p. 7
- Trophon* (*Neptunea*) *peregrinus* DALL, 1921, p. 110, pl. 8, fig. 5; OLDROYD, 1927, vol. II, pt. II, p. 36, pl. 33, fig. 12
- Trophon* (*Austrotrophon*) *triangulatus* (Carpenter), DALL, 1921, p. 109 in part; OLDROYD, 1927, vol. II, pt. II, p. 28, pl. 34, figs. 6, 7 type; KEEN, 1937, p. 48
- In part *Trophon* (*Austrotrophon*) *triangulatus* (Carpenter), BAILY, 1935, West Coast Shells (KEEP), p. 244, fig. 244 = *T. catalinensis* OLDROYD, 1927, vol. II, pt. II, p. 29, pl. 34, figs. 1-5
- Boreotrophon triangulatus* (Carpenter), BURCH, 1945, no. 51, p. 55, 60; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 190; ABBOTT, 1954, p. 208, fig. 46b same figure as DALL, 1892, pl. 5, fig. 3
- Boreotrophon peregrinus* (Dall), BURCH, 1945, no. 51, p. 58; SMITH AND GORDON, 1948, California Acad. Sci., Proc., vol. XXVI, no. 8, p. 234

"Cat. Is., 60 fm. Resembles the young of *Murex centrifugus*" [Carpenter, 1864b, p. 613]

"Typhoid shape: frills triangular, white 60 fm. Cf." [Carpenter, 1864b, p. 663]

The original description has been republished by Oldroyd (1927). The following corrections and additions should be made to make her copy complete:

"... State Collection, no. 580a."

Page 29, line 3: insert "apertam" between "spinam" and "compressis."

Insert before paragraph beginning "Resembles" the following:

"... div. 70".

"*Hab.* Catalina Island, 60 fm.: 4 alive of equal size, *Cooper*." [Carpenter, 1866a, p. 224]

Dall discussed this species in detail (1891) and figured the type (a young shell) and an adult individual from San Pedro. Dall later (1902) repeated his earlier statements.

J. Wyatt Durham furnished the following notes regarding the "types" (syntypes) in the University of California, Museum of Paleontology:

"*Trophon triangulatus* Carpenter—Two specimens in our [Univ. California, Mus. Paleo.] collection labelled Type. (1) Univ. Calif. Mus. Paleo. no. 12571, no old labels with it; present label 10-15 years old, with following notations (all in same handwriting): Carpenter: Brit. Assn. Adv. Sci. for 1863, p. 663 = 1864; Oldroyd: 1927, L S J U, vol. 2, p. 28, pl. 34, f. 6. Recent. Catalina Island, California. Carpenter: 1865, Pr. C.A.S., vol. 3, p. 224.

"(2) Univ. Calif. Mus. Paleo. no. 12572. No old labels; present label same kind as above. Notations: Carpenter: 1864, Rept. Brit. Assn. Adv. Sci. for 1863, p. 663; Oldroyd: 1927, L S J U 2, pt. 2, p. 28, pl. 34, fig. 7. Recent. Catalina Island, Calif. Carpenter: 1865, pr. C A S, vol. 3, p. 224.

"This specimen still has the operculum with it. Otherwise the two are in equally good condition. Perhaps 12572 should be designated as the Lectotype."

In referring to the specimen at the University of California as the type which he figured (1892), Dall described the specimen as containing the operculum. The writer therefore identifies no. 12572, University California Museum Paleontology as that shell and selects that specimen as the lectotype of the species.

A specimen in the U. S. National Museum, no. 11839, is labelled, "Catalina Id. Cooper Type fig'd." The shell is 10 mm. length and 6 mm. greatest diameter; hence it is a young shell about the size of the lectotype. From the original description (1866) there could be syntypes, all from Catalina Island and of the same size. If the specimen in the U. S. National Museum was indicated as type in Dall's day, it is odd that Dall did not describe that specimen and figure it instead of going so far afield. As the labels stand it can be regarded as a syntype and a lectotype can be chosen from the three syntypes, which is what the writer has done above.

Oldroyd figured both University California syntypes. The U. S. National Museum "syntype" apparently has not been figured, regardless of the label.

This species does not seem to be typical *Troponopsis* [*Boreotrophon*].

*Dimensions*.—Length 11.5 mm.; diameter 6.3 mm. (lectotype, Dall).

*Types*.—Lectotype, Univ. California, Museum of Paleontology, no. 12572; paratype, University California Museum Paleontology no. 12572; "paratype," U. S. National Museum, no. 11839.

*Distribution*.—Recent. Catalina Island, California (type); Monterey, California, to Catalina Island and San Pedro, to San Diego, California (Burch). Pleistocene. California (Cooper; Arnold; Grant and Gale).

Family MAGILIDAE

Genus *Latiaxis* Swainson, 1840

*Latiaxis costata hindsii* (Carpenter)

*Trophon muricatus* HINDS, 1844, Voy. Sulphur, Moll., p. 14, pl. 1, figs. 16, 17 not *Murex muricatus* MONTAGU, 1803, Testacea Britannica, p. 262

*Trophon Hindsii* CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856,<sup>102</sup> p. 205

*Latiaxis costata hindsii* (Carpenter), BURCH, 1945, no. 52, p. 11

The specific name of this Panama species was changed by Carpenter, because he thought the *Murex muricatus* Montagu was congeneric (secondary homonym). Oldroyd (1929, p. 99) renamed shells *Coralliophila Oldroydi* from Catalina Island which had gone under Carpenter's name. Burch enumerated the factors in regard to the identification of Oldroyd's and Hinds' (original) species. He believed that they are distinct and extended the range of *L. costata hindsii* from Point Conception to Panama. The type of the species is a shell from the "Voyage of the Sulphur" and not one of Carpenter's. The name is included here only to explain Carpenter names.

Family COLUMBELLIDAE

Genus *Mitrella* Risso, 1826

*Mitrella* RISSO, 1826, Hist. Nat. Eur. Merid., vol. 4, p. 247; GRANT AND GALE, 1931, p. 689  
Type species by subsequent designation, COX, 1927, Rept. Pal. Zanzibar, Moll., p. 28, *M. flaminea* RISSO, 1826, Hist. Nat. Eur. Merid., vol. 4, p. 248, = *Murex scriptus* LINNAEUS, 1758, Syst. Nat., 10 ed., p. 755. Recent and subfossil. Mediterranean. GRANT AND GALE, 1931, p. 690, text fig. 6

*Mitrella gouldi* (Carpenter)

?*Nitidella gouldii* CARPENTER in GOULD AND CARPENTER 1856, Zool. Soc. London, Proc., p. 208; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 228, 341, 349; 1864b, p. 535, 537, 567, 603, 663; Reprint, 1872, p. 21, 23, 53, 89, 149; 1860, Smith. Misc. Collec., vol. 2, art. 6, p. 4; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 38; 1870, Amer. Jour. Conch., vol. VI, p. 70; TRYON, 1883, Man. Conch., vol. 5, p. 217 as equal to *C. carinata* Hinds; PACE, 1902, Malacol. Soc. London, Proc., vol. 5, p. 88; DALL, 1921, p. 104; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 98; 1927, vol. II, pt. I, p. 277; ABBOTT, 1954, p. 222, pl. 20, fig. m

Cf. *Columbella* (*Nitidella*) *dalli* E. A. SMITH, 1880, Ann. Mag. Nat. Hist., ser. 5, vol. 6, p. 287 *vide* DALL, 1916, Nautilus, vol. 30, no. 3, p. 26

*Mitrella gouldi* (Carpenter), GRANT AND GALE, 1931, p. 695; KEEN, 1937, p. 40; BURCH, 1945, no. 51, p. 17; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 187

Not *Columbella gouldi* Agassiz ms., REEVE, 1858, Conch. Icon., vol. 11, *Columbella*, pl. XXII, fig. 135

Oldroyd (1927) republished part of the original description of this species. To her copy should be added the following:

"... div. 37°.

"*Hab.* Sta. Barbara (*Jewett*). Mus. Gould.

"Closely resembling *N. cribraria*; distinguished from *C. Sta.-Barbarensis* by the smooth whirls [*sic*] and apex, and the conspicuous labral teeth. The two specimens examined differ too much from each other in colour-markings to found specific characters upon these features." [Carpenter, 1856d, p. 208]

"Not to be confounded with *Col. Gouldiana*, Agass. which is probably *Amycla*." [Carpenter, 1864b, p. 535]

"*Columbella Gouldii*, Agass., MS. is Mus. Cum., Nov. 1858. [= *Amycla Gouldiana* Atlantic; non *Nitidella Gouldii*, Cpr.]" [Carpenter, 1864b, p. 567]

<sup>102</sup> Dall (1921, p. 113) gave incorrect reference to "Mazatlan Cat."

" . . . P.Z.S. 1856, p. 208. Slender: like thin *A. gausapata*, with Purpuroid operc." [Carpenter, 1864b, p. 663]

The holotype of this species has not been found. It is not reported in the types of the Gould Collection (27th Ann., Rept. New York State, p. 47), in Albany, New York. It is not in the British Museum (G. L. Wilkins, Oct. 17, 1950, personal communication).

*Holotype*.—Not found

*Distribution*.—Recent. Santa Barbara, California (type); Kodiak, Alaska, to San Diego, California. Pleistocene. California (Oldroyd, 1925; Grant and Gale). Pliocene. California (Moody, 1916 *vide* Grant and Gale; Grant and Gale)

***Mitrella tuberosa* (Carpenter)**

(Pl. 26, figs. 9-12)

*Amycla tuberosa* CARPENTER, 1864b, p. 537, 539, 628, 662; Reprint, 1872, p. 23, 25, 114, 148; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 398; Reprint, 1872, p. 288; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 37; 1870, Amer. Jour. Conch., vol. VI, p. 68; 1888, 7th Ann. Rept. California State Min. Bur., p. 229; PACE, 1902, Malacol. Soc. London, Proc., 5, p. 146

*Columbella (Mitrella) tuberosa* (Carpenter), TRYON, 1883, Man. Conch., vol. V, p. 135, pl. 50, figs. 40, 41

*Astyris tuberosa* (Carpenter), KEEP, 1887, West Coast Shells, p. 36

*Columbella (Astyris) tuberosa* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 213, pl. XX, fig. 6; ARNOLD, 1903, p. 240, pl. X, fig. 7; 1907, U. S. Geol. Sur., Bull., no. 321, pl. XI, fig. 10

*Columbella (Alia) tuberosa* (Carpenter), DALL, 1921, p. 103; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 97

*Columbella tuberosa* (Carpenter), OLDROYD, 1927, vol. II, pt. 1, p. 271

*Mitrella tuberosa* (Carpenter), GRANT AND GALE, 1931, p. 697, pl. 26, fig. 45 see for additional synonymy; BAILY, 1935, West Coast Shells (KEEP), p. 231; KEEN, 1937, p. 40; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 77; BURCH, 1945, no. 51, p. 13, 14, 16; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 187; ABBOTT, 1954, p. 223

"Very close to *minor*, Scacchi, but with different nucleus. 8-10 fm. c. *Cp.*" [Carpenter, 1864b, p. 662]

Oldroyd (1927) republished part of the original description of this species. To her copy should be added the following to make the notes complete:

" . . . div. 30°.

"*Hab.* Sta. Barbara, recent and fossil (*Jewett*); coast of California north to Monterey; Catalina Island, 8-10 fathoms (*Cooper*).

"As this belongs to a group of closely allied species of Nassoid Columbellae, a minute diagnoses is given. The fossil specimens are larger, and have the remarkable nucleus more perfect than any of the recent shells yet seen. In appearance it scarcely differs from the small variety of the Mediterranean *A. minor*, Scac.; but that (with *A. corniculata*) has a Chrysodomid nucleus, the Californian an Alaboid." [Carpenter, 1865h, p. 398]

The type material of this species consists of five specimens on Carpenter original glass mounts in the Redpath Museum. They have an original label, "*Astyris tuberosa* Cpr. type Sta. Barbara fossil *Jewett*." The nuclear whorls are well preserved and consist of about 3½ whorls, the first minute. The nuclear whorls are globose and differentiated from the postnuclear whorls. Carpenter commented especially on the fine preservation of the nucleus of the fossil shells.

*Syntypes*.<sup>103</sup>—Redpath Museum, No. 73

*Distribution*.—Recent. Santa Barbara, California, to Forrester Island, Alaska, to Gulf of California (Dall). Pleistocene. Lower Santa Barbara formation, Santa Barbara, California (type); California Arnold; Oldroyd, "var." 1925; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew; Mexico (Jordan, 1926). Pliocene. California (Cooper; Arnold; Berry, 1908; Grant and Gale; "var." Woodring and Bramlette, 1950). Miocene. California (Gale *in* Grant and Gale)

<sup>103</sup> Statement in Oldroyd (1927), followed by Grant and Gale (1931) that the type might be in the British Museum is incorrect.



Genus *Amphissa* H. and A. Adams, 1853

*Amphissa* H. AND A. ADAMS, 1853, Genera Recent Moll., vol. 1, p. 111

Type species by subsequent designation, DALL, 1913, U. S. Nat. Mus., Proc., vol. 45, no. 2202, p. 589, *Buccinum corrugatum* REEVE, 1847, Conch. Icon., vol. 3, *Buccinum*, pl. XIV, fig. 110. Not *B. corrugatum* BROCCIII, 1814. *B. corrugatum* REEVE, 1847 = *A. columbiana* DALL, 1916, Nautilus, vol. 30, p. 27. Living, Ciachi Islands, Alaska, to San Pedro, California. Pliocene and Pleistocene, California. DALL, 1921, U. S. Nat. Mus., Bull. 112, pl. 6, fig. 9; pl. 11, fig. 9

***Amphissa undata* (Carpenter)**

(Pl. 23, figs. 21, 22)

*Amycla undata* CARPENTER, 1864b, p. 613, 662; Reprint, 1872, p. 99, 148; 1864, California Acad. Sci., Proc., vol. III, p. 159; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 37; 1888, 7th Ann. Rept. California State Min. Bur., p. 229; PACE, 1902, Malacol. Soc. London, Proc., vol. 5, p. 148

*Columbella undata* (Carpenter), TRYON, 1883, Man. Conch., vol. V, p. 177, section *Seminella*  
*Amphissa undata* (Carpenter), DALL in WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 214, pl. XX, fig. 8; DALL, 1921, p. 105; OLDROYD, 1927, vol. II, pt. I, p. 282; BAILY, 1935, West Coast Shells (KEEP), p. 234, fig. 227 same fig. as WILLIAMSON, pl. XX, fig. 8; KEEN, 1937, p. 29; BURCH, 1945, no. 51, p. 25, 27; SMITH AND GORDON, 1948, California Acad. Sci. Proc., ser. 4, vol. XXVI, p. 188; ABBOTT, 1954, p. 224, fig. 50c same fig. as in WILLIAMSON, 1892

"... Cat. Is., not rare in 40 fm." [Carpenter, 1864b, p. 613]

"Like stumpy, small *corrugata*, with waved sculpture. 40 fm. not r. *Cp.*" [Carpenter, 1864b, p. 662]

Oldroyd (1927) republished a part of the original notes of this species. The following changes should be made in those notes:

Delete "poll" and add "div. 45°."

"The nuclear whorls in this shell resemble a minute *Paludina*. The only operculum in the specimens sent was broken in extraction, but appeared to be Nassoid. The sculpture consists of elongate knobs swelling in the middle; with spiral lines hanging as it were from pier to pier, as in a suspension bridge. The aperture is somewhat Columbelloid, the inner and outer lips joining at the suture; but neither are lirate within, although they have that appearance from the outside sculpture showing through." [Carpenter, 1864a, p. 159]

The holotype of this species is in the U. S. National Museum. It bears the label, "Cp. 1003 Catalina Id. Cooper." That number does not coincide with the one given by Carpenter ("State Collection Species 1067").

The protoconch of the holotype consists of about four whorls, the first minute; the earliest three are smooth, and the last has longitudinal ribs.

*Holotype*.—U. S. National Museum, No. 23284

*Distribution*.—Recent, Catalina Island, California (type); Monterey, California, to Cerros Island, Lower California (Dall). Pleistocene, California (Woodring, Bramlette, and Kew, 1948)

Genus *Anachis* H. and A. Adams, 1853

*Anachis* H. AND A. ADAMS, 1853, Genera Recent Moll., vol. 1, p. 184

Type species by subsequent designation, TATE in WOODWARD, 1875, Man. Moll., 3d ed., app. p. 13 *Columbella scalarina* SOWERBY, 1832, Zool. Soc. London, Proc., p. 116. Living. Panama. TRYON, 1883, Man. Conch., vol. V, pl. 54, fig. 39

***Anachis penicillata* Carpenter**

(Pl. 23, figs. 4-6)

?*Anachis penicillata* CARPENTER, 1864b, p. 537, 664; Reprint, 1872, p. 23, 150; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 398; Reprint, 1872, p. 288; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 39; 1870, Amer. Jour. Conch., vol. VI, p. 70; KEEP, 1887, West Coast Shells, p. 19

*Columbella (Seminella) penicillata* (Carpenter), TRYON, 1883, Man. Conch., vol. V, p. 177, pl. 58, fig. 46 omitted

*Columbella (Anachis) penicillata* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 213 (Dall)

*Anachis penicillata* Carpenter, DALL, 1921, p. 103; OLDROYD, 1927, vol. II, pt. I, p. 270; KEEN, 1937, p. 29; BURCH, 1945, no. 51, p. 21, 22; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 77; SMITH AND GORDON, 1948, California Acad. Sci., Proc., 4th ser., vol. XXVI, p. 187; ABBOTT, 1954, p. 221

*Anachis (Chauvetia) penicillata* (Carpenter), GRANT AND GALE, 1931, p. 687; BAILY, 1935, West Coast Shells (KEEP), p. 232

"Small, with Metuloid sculpture. Beach—10 fm. *Cp.*" [Carpenter, 1864b, p. 664]

Oldroyd (1927) republished Carpenter's (1865) description. The following notes should be added to make that copy complete:

"... div. 25°.

"*Hab.* Sta. Barbara (*Jewett*); S. Diego, Catalina Island, shore to 10 fathoms (*Cooper*).

"Neither of the specimens sent is quite mature. The mouth is that of an adolescent *Anachis*, but the sculpture is Metuloid." [Carpenter, 1865h, p. 398]

The types are in the U. S. National Museum labelled "San Diego—Sta. Barbara Cat. I" consisting of two specimens. The specimens are not segregated as to each locality. The larger of the two is the nearest to the dimensions given by Carpenter (.21 = 5.3 mm.; .08 = 2.03 mm.). The writer, therefore selected the longer specimen (pl. 23, fig. 4) as the lectotype.

*Types.*—Lectotype and paratype, U. S. National Museum, No. 15576

*Distribution.*—Recent. San Diego—Santa Barbara—Catalina Island, California (type); Pescadero Point, San Mateo Co., Santa Barbara, California, to Gulf of California (Burch). Pleistocene. California (Oldroyd, 1925; Grant and Gale; Woodring, Bramlette, and Kew, 1946)

#### *Anachis subturrita* Carpenter

(Pl. 23, figs. 7, 8)

*Anachis subturrita* CARPENTER, 1864b, p. 613, 664; Reprint, 1872, p. 99, 150; 1866, California Acad. Nat. Sci., Proc., vol. III, p. 223; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 39; KEEP, 1887, West Coast Shells, p. 19; DALL, 1921, p. 103; OLDROYD, 1927, vol. II, pt. I, p. 270, Tryon reference incorrect; GRANT AND GALE, 1931, p. 689; BAILY, 1935, West Coast Shells (KEEP), p. 232; KEEN, 1937, p. 29; BURCH, 1945, no. 51, p. 23

*Columbella (Seminella) subturrita* (Carpenter), TRYON, 1883, Man. Conch., vol. V, p. 178, pl. 58, fig. 47

*Anachis petravisi* DALL, 1908, U. S. Nat. Mus., Proc., vol. 34, no. 1610, p. 250 *vide* DALL, 1916, Nautilus, vol. 30, no. 3, p. 26

"Aspect of small *Rissoina*. 20 faint ribs: no spiral sculpture." [Carpenter, 1864b, p. 664]

Oldroyd (1927) republished Carpenter's description (1866). The following lines should be added to make the copy complete:

"... div. 30°.

"*Hab.* San Diego, *Cooper*. From shell washings.

"The only specimen seen of this tiny species is not quite mature, and has formed no labral teeth." [Carpenter, 1866a, p. 223]

In the Oldroyd copy delete "mm."

The holotype of this species is in the U. S. National Museum, no. 14952. It is labelled "San Diego Cooper." The specimen has plications on the interior of the labrum, but there are none on the labium.

*Holotype.*—U. S. National Museum, no. 14952 [U. S. National Museum no. 110645, holotype *A. petravisi* Dall]

*Distribution.*—San Diego, California (type); San Pedro, California, to Tres Marias Islands, Mexico (Burch)

Genus *Columbella* Lamarck, 1799

#### "*Columbella*" *santa-barbarensis* Carpenter

This species was described and named by Carpenter (1856, p. 208) as *C. Santa-Barbarensis* from that area of distribution. Later Carpenter (1864b, p. 535, 567, 625) corrected the distribution and thereby renamed the species *C. reevei*. The substitute name, of course, could only be applied unless the original was a homonym. Unfortunately this is not the case, and the first name must stand.

The species does not belong in the fauna of this report. The syntypes are in the Redpath Museum, no. 74. They will be figured in the report of the Carpenter types of the Lower California area.

**Genus *Aesopus* Gould, 1860**

*Aesopus* GOULD, 1860, Boston. Soc. Nat. Hist., Proc., vol. 7, p. 383

Type species by monotypy *Aesopus japonicus* GOULD, 1860, Boston Soc. Nat. Hist., Proc., vol. 7. Recent. Kagoshima Bay, Japan.

***Aesopus chrysalloides* (Carpenter)**

(Pl. 23, figs. 18-20)

?*Amycla chrysalloidea* CARPENTER, 1864b, p. 613, 662; Reprint, 1872, p. 99, 148; 1866, California Acad. Sci., Proc., vol. III, p. 223; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 37

*Columbella (Mitrella) chrysalloidea* (Carpenter), TRYON, 1883, Man. Conch., vol. V, p. 135, pl. 50, fig. 42

*Columbella (Aesopus) chrysalloidea* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 213; ARNOLD, 1903, p. 237, pl. V, fig. 6 shape not typical

*Aesopus chrysalloides* (Carpenter), DALL, 1921, p. 105; OLDROYD, 1927, vol. II, pt. I, p. 279; GRANT AND GALE, 1931, p. 703; KEEN, 1937, p. 28; BURCH, 1945, no. 51, p. 24

*Aesopus chrysalloides* (Carpenter), BAILY, 1935, West Coast Shells (KEEP), p. 232; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 77

"Shape of *Truncaria eurytoides*, but mouth not effuse: spirally furrowed. Shoal-water, Cp." [Carpenter, 1864b, p. 662]

A copy of part of Carpenter's (1866) notes was republished by Oldroyd (1927). The following changes should be made in her copy: Delete "poll."

Add:

". . . div. 25°.

"Hab. San Pedro, 1 on beach; San Diego, 30, some alive in 8 fms. on sand, in upper part of bay. Cooper.

"This is one of the most beautiful, (without a knowledge of either animal, or operculum) but most puzzling of the small shells of California. It has relations with *Euryta*, *Truncaria*, *Metula*, and *Daphnella*." [Carpenter, 1866a, p. 223]

The type material consists of five specimens in the U. S. National Museum with a label, "San Diego Cooper" in writing. A printed label of "San Pedro" is included. Thus one cannot segregate the specimens by exact locality.

The chief characteristic of sculpture is the presence of the regular microscopic spiral striations over the whole surface. Such striations are on the young shells as well as on adults. The immature shells are less slender, and the spire is not so elevated as on the older specimens. A short and stubby young individual has plications on the interior of the labrum similar to those on the adult. The apex of the shells is minute and sharp. There is a band just below the suture; some have brown spots in their coloration.

*Dimensions*.—Length 10 mm.; greatest diameter 4 mm. (largest); length 3.5 mm.; greatest diameter 2 mm. (smallest)

*Syntypes*.—U. S. National Museum, no. 14953 (15325C)

*Distribution*.—Recent, San Diego, or San Pedro, California (type); Santa Monica to San Diego, California (Burch). Pleistocene (Woodring, Bramlette, and Kew, 1946)

***Aesopus eurytoides* (Carpenter)**

(Pl. 23, figs. 14-17)

*Truncaria eurytoides* CARPENTER, 1864a, July, Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 47; Reprint, 1872, p. 220; 1864b, Aug., p. 619; Reprint, 1872, p. 105; TRYON, 1882, Man. Conch., vol. IV, p. 10; PACE, 1902, Malacol. Soc. London, Proc., vol. 5, p. 80

*Aesopus eurytoides* (Carpenter), DALL, 1921, p. 105; OLDROYD, 1927, vol. II, pt. I, p. 278; KEEN, 1937, p. 28; BURCH, 1945, no. 51, p. 23, 24

"Common; rubbed. Also Guacomayo, in the Smithsonian Museum." [Carpenter, 1864b, p. 619]

Oldroyd (1927) republished the Carpenter description (1864a). In her copy read .3 for .03, .2 for .02 and add "div. 23°" at the end of the line.

The type material consists of seven specimens in the U. S. National Museum, labelled "Cape St. Lucas Xantus."

One specimen has a brown tip of three whorls. The others have the whorls white. The shells are partially transparent, and some have a few light-brown spots. All have fine longitudinal ribs or lines. One specimen has a smooth body whorl and has fine teeth on the inside of the labrum. Other individuals have the labrum smooth within. Some specimens show a band below the sutures; others do not have this feature.

*Dimensions*.—Largest syntype: length 18 mm.; greatest diameter 5 mm.; syntype: length 6 mm.; greatest diameter 2 mm.

*Syntypes*.—U. S. National Museum, No. 4148

*Distribution*.—Cape San Lucas, Lower California (type); San Diego, California, to Panama (Dall)

Family NASSARIIDAE  
Genus **Nassarius** Dumeril, 1806

*Nassarius* DUMERIL, 1806, Zoologie Analytique, p. 166 genus without species.

Type species by monotypy Froriep's translation of DUMERIL, 1806, Anal. Zool., p. 167 see IREDALE, 1916, Mal. Soc. London, Proc., vol. 12, p. 83 *B. ancularia* [sic]. *Buccinum arcularia* LINNAEUS, 1758, Syst. Nat., 10th ed., p. 737; Recent. Philippines. TRYON, 1882, Man. Conch., vol. IV, pl. 7, figs. 9, 10

**Nassarius insculptus** (Carpenter)

- Nassa insculpta* CARPENTER, 1864b, p. 613, 616, 662; Reprint, 1872, p. 99, 102, 148; 1866, California Acad. Nat. Sci., Proc., III, p. 223; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 36; TRYON, 1882, Man. Conch., vol. IV, p. 38, *Zeuxis* pl. 12, fig. 154 identified by Stearns; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 212, pl. XXIII, fig. 6 not type as stated; ARNOLD, 1903, p. 233  
Not *Nassa insculpta* Carpenter, COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 253 *vide* DALL, 1917, p. 576  
*Alectrion insculptus* (Carpenter), DALL, 1917, U. S. Nat. Mus., Proc., vol. 51, no. 2166, p. 576  
*Alectrion* (*Zeuxis*) *insculptus* (Carpenter), DALL, 1921, p. 103  
*Alectrion* (*Schizopyga*) *insculptus* (Carpenter), OLDROYD, 1927, vol. II, pt. I, p. 267, pl. 26, fig. 12  
*Nassarius insculptus* (Carpenter), GRANT AND GALE, 1931, p. 677; BURCH, 1945, no. 51, p. 6; KEEN, 1937, p. 41; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 187; DEMOND, 1951, Nautilus, vol. 65, no. 1, p. 17; 1952, Pacific Science, vol. VI, no. 4, p. 312, pl. 11, fig. 3, *eupleura* fig. 1; ABBOTT, 1954, p. 237, fig. 53f same fig. as WILLIAMSON, 1892  
*Nassarius* (*Zeuxis*) *insculptus* (Carpenter), BAILY, 1935, West Coast Shells (KEEP), p. 229, fig. 221 same as WILLIAMSON, 1892

"Cat. Is., living in 40 fm., rare" [Carpenter, 1864b, p. 613]

"*Zeuxis*, with varix and non-reflexed callus. Spirally grooved. 40 fm. living, r. *Cp.*" [Carpenter, 1864b, p. 662]

The description of 1865 of this species was republished by Oldroyd (1927). The following notes should be added to make that copy complete:

Delete "mm."

Add:

"... State Collection 1008.

"... div. 45°.

"*Hab.* Catalina Inland, 30–40 fm.; 15 mostly alive, but few mature; animal white; *Cooper*.

"This singularly beautiful species probably belongs to the section *Zeuxis*, H. & A. Adams. The callus is slightly reflexed in the best specimen." [Carpenter, 1866a, p. 223]

Although the explanation of the figure of this species given in Williamson stipulated "Type specimen 46625," the label with the specimen in the U. S. National Museum no. 46625 does not so indicate. It reads "San Pedro Stearns Coll." The original material was collected by Cooper and belonged to the California State Collection, so that the Stearns shells could not be types.

*A. insculptus eupleura* Dall (1917, p. 576) is not regarded by workers as of subspecific rank (Grant and Gale, 1931, p. 677; Burch, 1945, no. 57, p. 6).

*Type*.—Not found

*Distribution*.—Recent. Catalina Island, California (type); Point Arena, California, to Cerros Island, Lower California (Dall). Pliocene (Grant and Gale). Pleistocene (Arnold)

#### Family NEPTUNEIDAE

#### Genus *Calicantharus* Clark, 1938

*Calicantharus* CLARK, 1938, Geol. Soc. American, Bull., vol. 49, no. 5, p. 712 as subgenus *Cantharus*

Type species by original designation, *Pisania fortis* CARPENTER, 1866, Ann. Mag. Nat. Hist., ser. 3, vol. XVII, p. 277. Pleistocene. California. WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, pl. 29, figs. 28, 29

#### *Calicantharus fortis* (Carpenter)

*Pisania fortis* CARPENTER, 1864b, p. 539; Reprint, 1872, p. 25; 1866, Ann. Mag. Nat. Hist., ser. 3, vol. XVII, p. 275, 277; Reprint, 1872, p. 322, 324; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 260; ARNOLD, 1903, p. 227; VAN WINKLE [Palmer], 1921, Bull. Amer. Paleont., vol. 36, no. 8, p. 350 type not found

*Cantharus fortis* (Carpenter), GRANT AND GALE, 1931, p. 647, pl. 28, fig. 2 see for further synonymy; HANNA AND HERTLEIN, 1941, Div. Mines, California, Bull., no. 118, pt. 2, fig. 64-12 Pliocene

*Calicantharus fortis* (Carpenter), CLARK, 1938, Geol. Soc. America, Bull., vol. 49, p. 712; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prop. Paper 207, p. 75, pl. 29, figs. 28, 29

"P. testa P. insigni simili, sed soldidiore; crassissima, sculptura valde impressa; anfr., norm. v., parum rotundatis, suturis distinctis; costis radiantibus t. juniore circ. XII., obtusis, parum expressis, postea obsolete; liris spiralibus validis, crebris (quarum t. juniore v. postea x., in spira monstrantur), subaequalibus, anticis majoribus; canali recurvata; lacuna umbilicali magna; labro intus crebrilirato; labio conspicuo, spiralliter rugose lirato. "*Hab.* Sta Barbara, Pleistocene formation (Jewett).

"Col. Jewett's single specimen is in very fine condition, and is confirmed by a fragment obtained by Mr. Gabb, the paleontologist of the California State Survey. Although resembling *Purpura aperta* and congeners in the irregular rugose folds of the labium, and *Siphonalia* in the strongly bent canal, Mr. H. Adams considers that its affinities are closest with the *Cantharus* group of *Pisania*. That genus is extremely abundant in the tropical fauna, but does not now live in California. It is the only distinctly tropical shell in the whole collection; and its presence, along with so many boreal species and types, appears somewhat anomalous, like the appearance of *Voluta* and *Cassidaria* in the Crag fauna. It is distinguished from the extreme forms of *P. insignis* by having the spiral lirae pretty equally distributed over the early whorls, by the close internal ribbing of the labrum, by the absence of the stout posterior parietal tooth, and by the great development of the columellar folds." [Carpenter, 1866, p. 277]

The only type has been lost. The species is rare in the San Pedro sand at Deadman Island, Timms Point silt, and Palos Verdes sand but common in the Lomita marl of the Pleistocene series of the San Pedro area.

*Holotype*.—Not found

*Distribution*.—Lower Pleistocene.<sup>104</sup> Santa Barbara formation; near Santa Barbara, California (type). Lower and upper Pleistocene. Palos Verdes Hills, California (Woodring, Bramlette, and Kew)

#### Genus *Exilioidea* Grant and Gale, 1931

*Exilioidea* GRANT AND GALE, 1931, San Diego Soc. Nat. Hist., Mem., vol. I, p. 665

Type species by original designation, *Chrysodomus rectirostris* CARPENTER, 1865, Acad. Nat. Sci. Philadelphia, Proc., p. 64. Recent. Behm Canal, Alaska, to Cape San Quintin, Lower California. BENTSON, 1940, Univ. California Pub., Dept. Geol. Sci., vol. 25, pl. 1, fig. 22

#### *Exilioidea rectirostris* (Carpenter)

*Chrysodomus rectirostris* CARPENTER, 1864b, p. 603, 664; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 64; ARNOLD, 1903, p. 228, pl. VII, fig. 7

<sup>104</sup> Also determined as upper Pliocene, or in part upper Pliocene and lower Pleistocene.

- Sipho rectirostris* (Carpenter), TRYON, 1881, Man., Conch., vol. III, p. 131, pl. 53, fig. 348 copy KOBELT, t. 45, fig. 7 poor illustration of type (see Tryon for reference)
- Tritonofusus (Plicifusus) rectirostris* (Carpenter), DALL, 1902, U. S. Nat. Mus., Proc., vol. 24, no. 1264, p. 525, not pl. XXXIV, fig. 2
- ? *Exilia rectirostris* (Carpenter), DALL, 1918, U. S. Nat. Mus., Proc., vol. 54, p. 221
- Exilia rectirostris* (Carpenter), DALL, 1921, p. 92; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 90 not pl. 19, fig. 2 same as DALL, 1902, pl. XXXIV, fig. 2; OLDROYD, 1927, vol. 11, pt. 1, p. 206, not pl. 6, fig. 7, pl. 28, fig. 2 same as DALL, 1902, pl. XXXIV, fig. 2
- Exilioidea rectirostris* (Carpenter), GRANT AND GALE, 1931, p. 665, pl. 28, fig. 5; BAILY, 1935, West Coast Shells (KEEP), p. 251, not fig. 257 same as DALL, 1902; KEEN, 1937, p. 36; BENTSON, 1940, Univ. California Pub. Bull. Dept. Geol. Sci., vol. 25, no. 5, p. 203, 224, pl. 1, fig. 22 "*Exilioidea*"; BARTSCH, 1945, Nautilus, vol. 59, no. 2, p. 61, pl. 7, figs. 2, 3, 6; BURCH, 1945, no. 50, p. 16; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 74, pl. 32, fig. 12; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 186

"Small, white, smooth, with straight canal." [Carpenter, 1864b, p. 664]

A copy of Carpenter's (1865) description has been published by Oldroyd (1927). The following typographical corrections should be made in her copy:

Line 3: insert space between "costulis" and "radiantibus"; line 4: read "lineis" for "lincis"; add "div. 33°" to the dimensions:

Add:

"*Hab.*—In sinu Pugetiano, specimen unicum legit Kennerley.

"Aspectu Belam, forma Perronam, nisi labro haud sinuato, commemorat: characteribus plurimis subgeneri Siphoni convenit." [Carpenter, 1865e, p. 64]

Carpenter's first description (1864) of a smooth shell has confused authors such as Arnold (1903) who apparently was not aware of Carpenter's later (1865) notes in regard to the species. Carpenter at that time described the radiating costae, which, however, are fine. Tryon also did not take cognizance of the 1865 description. He figured a copy of Kobelt's illustration, which Tryon stated Dall had sent Kobelt. That drawing and the later one which Dall (1902) used to illustrate the species does not depict the shell properly. Dall's figure resembles *E. kelseyi* (Dall) figured by Bartsch (1945).

Dall did not state that the specimen figured (1902, no. 4815, U. S. National Museum) was the type, as was interpreted by Oldroyd and followed by Grant and Gale. The U. S. National Museum number of the type is 4515.

The confusion in regard to the holotype of this species was rectified by Bentson, who included an illustration of the holotype in her paper (1940). That specimen is badly worn. Bartsch (1945) included a fine illustration of the shell, operculum, head, and verge of the species and discussed the animal in detail.

The holotype has a label, "Puget Sound Dr. Kennerley."

*Dimensions.*—Length 45 mm.; greatest diameter 14 mm. (Bentson Fig.)

*Holotype.*—U. S. National Museum, no. 4515

*Distribution.*—Recent. Puget Sound, Washington (type); Behm Canal, Alaska, to Cape San Quintin, Lower California (Dall). Pleistocene, California (Arnold; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew)

#### Genus *Kelletia* Fischer, 1884

*Kelletia* FISCHER, 1884, Man. de Conchyliol., p. 625 (Boyle ms)

Type species by monotypy *Siphonalia kellei* (FORBES), 1850, Zool. Soc. London, Proc., p. 274, pl. IX, fig. 10. Recent. Santa Barbara, California, to San Quintin Bay, Lower California.<sup>105</sup>

? *Kelletia kellei* (Forbes), 1850, young

*Siphonalia fuscotincta* Carpenter

(Pl. 24, fig. 1)

*Siphonalia fuscotincta* CARPENTER, 1864b, p. 537, 663; Reprint, 1872, p. 23, 149; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 398; Reprint, 1872, p. 288; COOPER, 1867, Geog. Cat.

<sup>105</sup> Japan is included in the range of this species by authors, but Keen (1941, p. 481) suggested that the Japanese form is an unnamed species.

Moll., Geol. Sur. California, p. 38; 1871, Amer. Jour. Conch., vol. VI, p. 70; TRYON, 1881, Man. Conch., vol. III, p. 134

"Like the same [*S. kellestii*] in extreme miniature." [Carpenter, 1864b p. 663]

"S. testa minima, turrata, albida, apicem versus fusco tincta; anfr. nucl. ii, compactis, subplanatis, apice mamillato; norm. IV., convexis, suturis impressis; costis radiantibus rotundatis, tumentibus, basim versus evanidis, interstitiis undulatis, subaequantibus, lirulis crebis spiralibus, costas superantibus; apertura pyriformi in canalem brevem apertum contortum producta; labro acuto; labio haud conspicio; columella canalem versus valde contorta. Long. .17, long. spir. .1, lat. .08, div. 32°.

"Hab. Sta. Barbara (Jewett).

"The unique specimen is like a minute edition of *Siphonalia Kellestii*, but does not accord with the young of that or of any other species known in the region. It is probably not mature." [Carpenter, 1865h, p. 398]

The holotype of this form is in the Redpath Museum. It bears a label "unique type Sta Barbara Jewett" and consists of one specimen. The holotype is figured herein. It is, as Carpenter stated, an immature shell, 5 mm. in length.

*Holotype*.—Redpath Museum, no. 3138

*Distribution*.—Santa Barbara, California (type)

#### Family OLIVIDAE

#### Genus *Olivella* Swainson, 1831

*Olivella* SWAINSON, 1831, Zool. Illustrations, ser. 2, vol. 2, (13), Expl. pl. 58, *Oliva*, pl. 2

Type species by subsequent designation DALL, 1909, U. S. Geol. Sur., Prof. Paper 59, p. 31.

*Oliva furburata* SWAINSON = *O. dama* Mawe, Wood, 1828, Suppl. Index Test., pl. 5, [pl. 4], fig. 37a *vide* TRYON, 1883. Recent. West Coast Mexico. TRYON, 1883, Man. Conch., vol. V, pl. 17, fig. 39 copy SOWERBY, 1870, Thes. Conch., vol. 4, pl. 349, fig. 369

#### *Olivella baetica* Marrat in Sowerby

(Pl. 24, figs. 2-4, 6-8)

*Olivella baetica* CARPENTER, 1864b, p. 537, 541, 590, 661; Reprint, 1872, p. 23, 27, 76, 100, 147 *nomen nudum*; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 36; GABB, 1869, Pal. California, vol. 11, p. 75 (*boetica*) under *O. pedroana* (Conrad); COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 68; MARRAT in SOWERBY, 1871, Thes. Conch., vol. IV, p. 35, pl. 350, figs. 409, 410; TRYON, 1883, Man. Conch., vol. V, p. 71, pl. 17, figs. 28-31, 34; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 212, pl. XIX, fig. 7; ARNOLD, 1903, p. 221 *boetica* in synonymy of *O. pedroana* (Conrad); PACKARD, 1918, Univ. California Pub. Zool., vol. 14, p. 341 under *O. pedroana* (Conrad); T. S. OLDROYD, 1921, Nautilus, vol. 34, no. 4, p. 117, pl. V, figs. 1, 1a; figs. 2, 3 varieties (*boetica*); DALL, 1921, p. 85, pl. 15, fig. 1 *boetica*; I. S. OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 88, pl. 22, figs. 7, 8 (*boetica*) same as T. S. OLDROYD, 1921, pl. V, figs. 1, 1a; I. S. OLDROYD, 1927, vol. III, pt. 1, p. 163, pl. 26, figs. 22 same as T. S. OLDROYD, 1921, fig. 1, 22a (*boetica*); GRANT AND GALE, 1931, p. 627; BERRY, 1935, Malacol. Soc. London, Proc., vol. 21, pt. IV, p. 263; BAILY, 1935, West Coast Shells (KEEP), p. 226, fig. 216; KEEN, 1937, p. 43; BURCH, 1945, no. 49, p. 17, 18, 20, pl. III, fig. 21; ABBOTT, 1954, p. 247, pl. 20, fig. q

*Cf. Olivella nota* MARRAT in SOWERBY, 1871, Thes. Conch., vol. IV, p. 36, pl. 351, fig. 428 Vancouver's Island

"Narrow, dull, thin: has been erroneously called *amazora*, *tergina*, *petiolita*, and *rufifasciata*." [Carpenter, 1864b, p. 661]

Carpenter in the preliminary notes (1864b) to the above listed the species from Santa Barbara (p. 537), Monterey (p. 541), and in the final list (p. 661) from Santa Barbara, Oregon, California, Monterey, Puget Sound, Vancouver, and region between San Diego and San Pedro. One may, therefore, deduce that Carpenter was referring to a ubiquitous coastal *Olivella* north of the Gulf of California. Carpenter compared his *O. baetica* (p. 590) with Conrad's *O. pedroana*, and his procedure was followed by Gabb (1869). Carpenter did not later amplify the above brief and unidentifiable remarks and thereby indicate, as was his custom, particular specimens from a certain locality.

This species was never adequately described by Carpenter. It lacked an illustration, a type, and a type locality. Either of the first two items would compensate for the useless

descriptive remarks, but both are lacking. A review of the literature will reveal that the problem as to the identity of *O. baetica* as of Carpenter has not been satisfactorily settled. With lack of pertinent original data the problem will not be settled from a Carpenter source.

G. L. Wilkins (Oct. 17, 1950, personal communication) kindly reported on the material of the species in the British Museum (Natural History) as follows:

"We have two sets, one of 3 from Vancouver and one of 4 from San Pedro but none of them compare with Sowerby's figure. All Mus. Cuming."

There are in the Gould Collection, New York State Museum, Gould Collection A6350, labelled type<sup>106</sup>, 8 specimens of *O. baetica* Carpenter. They are all worn individuals. Three retain faint wavy colored lines. With the specimens is a printed Smithsonian Institution label of "*Olivella baetica* Cpr. = *O. petiolita*, Gld. (non Ducl.) Hab. Vancouver—California." This label is the standard printed form which the Smithsonian Institution used at the time that Carpenter was working for the Smithsonian in making up duplicate collections for distribution. Such labels are familiar to anyone who has examined collections in various museums which received specimens from the Smithsonian in the late 1860's and 1870's. There is then nothing to indicate that these 8 shells were types. Gould's personal number (A6350) on them may mean that they were specimens which Gould identified as *petiolita*, which Carpenter stated (1864b, p. 537) was not the *O. petiolita* of Duclou (1844, p. 5). They do not bear an exact locality. Therefore, so far they do not add any scientific information to the dilemma. The specimens are apparently those identified as *O. baetica* Carpenter and figured by Dall, Oldroyd and others. Two are figured herein (pl. 24, figs. 6-8).

Marrat (1871, p. 35, pl. 350, figs. 409, 410; Tryon, 1883, pl. 17, figs. 28, 29) was the first to use Carpenter's name with a description, figures, and a type locality. Marrat's (Sowerby) figures were copied by Tryon (1883). Copies of Marrat's figures and description are included herein. The writer, therefore, credits *O. baetica* to Marrat. This does not apparently upset the usual interpretation of *O. baetica*, and by giving the name a legitimate parent, a definite type locality, description, and figures are thereby gained. Tryon's suggestion that Marrat's *O. nota* (1871, pl. 351, fig. 428) from Vancouver Island might be referred to *O. baetica* looks reasonable. It seems to be the same sort of shell that Dall figured for *O. baetica*.

"182. BAETICA (f. 409, 410), *Carpenter*; *petiolita*, *Gould*.—*Quam O. alectona gracilisculior, coloribus magis nebulatis variegata; balteo castaneo, fasciato*.—The colours with which most of the specimens are variegated are more clouded, and the lines more spread into patches than in Duclou's figure of *O. alectona*, but the difference seems hardly essential.—ED. [Sowerby]." [Marrat in Sowerby]

*Type*.—"O *baetica*" Carpenter, not found.<sup>107</sup> Holotype, *O. nota* Marrat, is in the British Museum (Natural History), Department of Zoology (G. L. Wilkins, Oct. 17, 1950, personal communication).

*Distribution*.—Vancouver Island, British Columbia, includes Straits of Juan de Fuca (type); Kodiak Island, Alaska, to Cape San Lucas, Lower California (Dall)

#### *Olivella biplicata* Sowerby

"*Olivella glandinaria* (Nutt.) MS." Carpenter

*Olivella glandinaria* Nutt. CARPENTER, 1856, Zool. Soc. London, Proc., p. 227; 1857, Rept. Brit. Assoc. Adv. Sci. 1856, p. 201, 339; 1864b, p. 527, 661; Reprint, 1872, p. 13, 147

Carpenter (1856) described an *Olivella* from "upper California" which Nuttall had named in manuscript *Glandinaria Californica*. Carpenter (1864) identified the species as conspecific with *O. biplicata*, where it continues to be assigned.

<sup>106</sup> List of Gould types of Mollusca in the collection of the State Museum, 27th Ann. Rept. New York State Mus., 1874, p. 47. Through the courtesy of Dr. Carl Guthe, the specimens were loaned to the author for photographing. The original spelling of the specific name was "*baetica*" not "*boetica*."

<sup>107</sup> The type is not in the Academy of Natural Sciences at Philadelphia, as reported by Oldroyd (1927).



*Olivella intorta* Carpenter

(Pl. 24, fig. 5)

*Olivella intorta* CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856, p. 228, 234, 339, 352; CARPENTER in GOULD AND CARPENTER, 1856, Zool. Soc. London, Proc., pt. XXIV, p. 207; CARPENTER, 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 11 "Mexican and Panamic province"; not COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 36; not COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 68; MARRAT in SOWERBY, 1871, Thes. Conch., vol. IV, p. 36, pl. 351, fig. 455; TRYON, 1883, Man. Conch., vol. V, p. 66, 220, pl. 14, fig. 62 copy MARRAT; KEEP, 1887, West Coast Shells, p. 42; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 212 in part, not pl. XIX, fig. 9; ARNOLD, 1903, p. 220 in part; not PACKARD, 1918, Univ. California Pub. Zool., vol. IV, p. 340, pl. 37, fig. 7 = *O. pycna* BERRY, 1935, Malacol. Soc. London, Proc., vol. XXI, pt. IV, p. 264; not OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 88 under *O. pedroana* Conrad; GRANT AND GALE, 1931, p. 626 in part under *O. pedroana*; BERRY, 1935, Malacol. Soc. London, Proc., vol. XXI, pt. IV, p. 263 discussion of *O. pycna*; BAILY, 1935, West Coast Shells (KEEP), p. 227; BURCH, 1945, no. 49, p. 23; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 77; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 185

"*O. t. parva*, ovoidea, subteunte; sutura vix sulcata; albido-grisea, fascia indistincta subsuturali olivacea, flammulis et maculis purpureo-fuscis plus minusve ornata; apertura antice aperta, postice angusta; callositate parietali ad suturam penultimam producta; columella maxime intorta, plica ad basin acuta, in pariete duabus saepe indistinctis; extus, linea spirali antica unica.

"Long. .52, long. spir. .17, lat. .26, div. 60°.

"*Hab.* San Juan; legit *Dr. Green*. Mus. Gould. Item, loc. incert. Mus. Cuming.

"A well-marked species, resembling the West Indian *O. bullata*, on a much larger scale. The specimens vary in tumidity and height of spire. The parietal callosity extending over the penultimate whirl [*sic*] hides the colour of the spire." [Carpenter, 1856d, p. 207]

The specimen figured by Marrat (*in* Sowerby, 1871) is the first specimen mentioned by Carpenter. It is extant in the type collection of the British Museum (Natural History). It has a label, "San Juan, California Dr. Green" Mus. Cuming (G. L. Wilkins, Oct. 17, 1950, personal communication). The authorities of the British Museum generously furnished the included photograph of the type.

The specimen figured by Williamson (1892) is one of several, no. 47202, U. S. National Museum, from Santa Cruz, California, collected by Stearns. Under the present understanding of the species, it, therefore, would not be included under *O. intorta*.

*Holotype*.—British Museum (Natural History). Department of Zoology, 1950.11.9.2

*Distribution*.—San Juan,<sup>108</sup> Lower California (type)

Carpenter definitely put the San Juan of this locale in the Gulf of California region. He enumerated the other San Juans which might be confused with the one under consideration.

## Family MITRIDAE

*Mitra maura* Nuttall, ms., CARPENTER, 1856, Zool. Soc. London, Proc., p. 227; 1860, Smith Misc. Coll., v. 2, art. 6, p. 4, *nomen nudum*, not *Mitra maura* BRODERIP (1836, p. 193) Carpenter mentioned this shell as in the Nuttall Collection from "upper California."

## Family MARGINELLIDAE

Genus *Gibberulina* Monterosato, 1884

(*Cypraeolina* Cerulli-Irelli, 1911; *Merovia* Dall, 1920)

*Gibberulina* MONTEROSATO, 1884, Nomen. Gen. Spec. Conch. Mediterrance, p. 139

Type species by subsequent designation, WENZ, 1941, Handbuch Palaeozool., Bd. 6, teil 6, p. 1373, *G. claneatina* (BROCCHI), 1814, Conch. foss. subapp., p. 642, pl. XV, fig. 11 as *Voluta*. Pliocene and Recent. Mediterranean

*Merovia* DALL (1921, p. 86) is synonymous. *Volutella pyriformis* Carpenter (= *Gibberulina pyriformis*) is the monotype

<sup>108</sup> Carpenter (1857b, p. 228 San Juan; p. 234 San Juan; p. 339, Gulf of California; p. 352 San Juan; p. 168 Loretto and Bay of San Juan, 26.5° [Gulf of California]; p. 168, "Besides this station [Bay of San Juan] and the Straits of De Fuca, there is a San Juan on the opposite shore near Guaymas; another near San Blas; a Point on the coast near Lake Nicaragua; and a little island between Is. Catalina and San Diego.")

*Gibberulina pyriformis* (Carpenter)

(Pl. 24, figs. 13-16)

*Volutella pyriformis* CARPENTER, 1864b, p. 661; Reprint, 1872, p. 147; 1865, Jour. de Conchyl., vol. XIII, p. 148; Reprint, 1872, p. 316; COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 68; TOMLIN, 1912, Malacol. Soc. London, Proc., vol. 12, p. 293

*Marginella pyriformis* (Carpenter), REDFIELD, 1867, Cat. Marginellidae, p. 253; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 36; TRYON, 1883, Man. Conch., vol. V, p. 41, pl. 13, fig. 38; KEEP, 1887, West Coast Shells, p. 43; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 212, pl. XX, fig. 5 type U. S. Nat. Mus.

*Merovia pyriformis* (Carpenter), DALL, 1921, p. 86

*Cypracolina pyriformis* (Carpenter), DALL, 1923, U. S. Nat. Mus., Proc., vol. 63, no. 2478, p. 2 corrected *Merovia* 1921; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 88; 1927, vol. II, pt. 1, p. 166; BAILY, 1935, West Coast Shells (KEEP), p. 223, fig. 214 type, same as WILLIAMSON, 1892; KEEN, 1937, p. 34; BURCH, 1945, no. 49, p. 27; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Nat. Mus., Prof. Paper 207, p. 77

*Hyalina (Cypracolina) pyriformis* (Carpenter), GRANT AND GALE, 1931, p. 632

*Gibberulina pyriformis* (Carpenter), ABBOTT, 1954, p. 260, fig. 56n same figure as WILLIAMSON, 1892

"Genus of Swainson (not D'Orb.) = *Closia*, Gray. Like *V. margaritula*, Maz. Cat. no. 589, but produced in front." [Carpenter, 1864b, p. 661]

Oldroyd published a copy of Carpenter's description (1865), but to make that copy complete the following changes should be made:

Correct "Long., .01" to ".1"

Add:

"Hab. San Diego, Cooper.—California, 'Pacific Railway exploring Expedition.'

"Cette espèce ressemble au *V. margaritula* (Maz. Cat., no. 589), mais elle est plus allongée en avant. Le genre *Volutella*, Swainson (non d'Orbigny), correspond au genre *Closia* de Gray." [Carpenter, 1865g, p. 148]

*G. margaritula* (Carpenter) (1857a, p. 462) measures long. .073; lat. .047 largest specimen.

There are in the U. S. National Museum two syntypes which are on an original Carpenter glass mount with a Carpenter label, "S. Diego (Cooper)." The two shells are figured herein. One is immature. A drawing of the other, an adult individual, was included in Williamson's paper (1892) on the shells of San Pedro Bay. The writer, therefore, selects that shell as the lectotype.

There are also in the Redpath Museum at McGill University 13 syntypes on an original Carpenter glass mount with a Carpenter label "type. S. Diego Monterey." Two of those specimens are figured herein. The McGill shells are less globose than the lectotype. The measurements of the lectotype length 2.5 mm. by greatest diameter 1.5 mm., are practically those of the type measurements (2.53 cm. by .1 = 2.53 mm. length; 2.53 cm. by .065 = 1.6435 mm. lat.)

*Types*.—Lectotype, U. S. National Museum, no. 14950 (larger of two); paratypes, Redpath Museum, no. 83 (as *Gibberulina*)

*Distribution*.—Recent. San Diego, California (type); Ishut Bay, Alaska, to Mazatlan, Mexico (Dall). Pleistocene. California (Oldroyd, 1925, as *C. margaritula*; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew); Mexico (Jordan, 1926)

Genus *Cystiscus* Stimpson, 1865

*Cystiscus* STIMPSON, Amer. Jour. Conch., vol. 1, 1865, p. 55

Type species by monotypy *C. capensis* STIMPSON, 1865, Amer. Jour. Conch., vol. 1 not of DUNKER, 1848, S. Africa Moll. (Krauss), p. 125, = *Marginella cystiscus* REDFIELD, 1870, Amer. Jour. Conch., vol. VI, p. 2, Suppl. p. 226, 230. Recent. Cape of Good Hope. STIMPSON, 1865, Amer. Jour. Conch., vol. 1, pl. 8, fig. 2; TRYON, 1883, Man. Conch., vol. V, pl. 12, fig. 70; pl. 2, fig. 11

For lack of anatomical data the species *C. jexvetti*, *C. regularis*, and *C. subtrigona* are left as previously classified. By comparison of the illustrations of *C. jexvetti* and *C. regularis* (pls. 24, 26) one can see how posteriorly the extent of the aperture approaches that of

*Gibberulina pyriformis*. *C. subtrigona* has the aperture shortened posteriorly, so that the species does not seem to belong with *C. jewetti* and *C. regularis*. Tentatively the species is left in the genus *Cystiscus*. *C. subtrigona* has denticulations on the outer lip, as in *G. pyriformis*, but it represents an extreme from *G. pyriformis* in the posterior character of the aperture.

*Cystiscus jewettii* (Carpenter)

(Pl. 24, figs. 19–21; Pl. 26, figs. 1, 2)

*Marginella Jewetti* CARPENTER in GOULD AND CARPENTER, 1856, Zool. Soc. London, Proc., p. 207; 1857, Rept. Brit. Assoc. Adv. Sci. for 1856, p. 228, 339, 349; 1860, Smith. Misc. Coll., vol. 6, art. 6, p. 4; 1864b, p. 537, 661; Reprint, 1872, p. 23, 147; REEVE, 1865, Icon. Conch., vol. 15, *Marginella*, not pl. XXVI fig. 146; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 36; 1870, Amer. Jour. Conch., vol. VI, p. 68; TRYON, 1883, Man. Conch., vol. V, p. 43, not pl. 12, fig. 57 copy REEVE; KEEP, 1887, West Coast Shells, p. 43, cf. fig. 23; COOPER, 1888, 7th Ann. Rept. California State Min., p. 249; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 212, pl. XIX, fig. 6; ARNOLD, 1903, p. 221; TOMLIN, 1917, Malacol. Soc. London, Proc., vol. 12, p. 273; DALL, 1921, p. 85; OLDROYD, 1927, vol. II, pt. I, p. 164; BAILY, 1935, West Coast Shells (KEEP), p. 222, fig. 212 same as WILLIAMSON; KEEN, 1937, p. 39; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 185

*Hyalina (Cystiscus) jewettii* (Carpenter), GRANT AND GALE, 1931, p. 630, pl. 24, fig. 17 var. *nanella* Oldroyd, see for additional references

*Cystiscus jewettii* (Carpenter), BURCH, 1945, no. 49, p. 24, 26

*Hyalina jewettii* (Carpenter), WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 77

*Persicula (Gibberula) jewetti* (Carpenter), ABBOTT, 1954, p. 258

"... Cpr. P.Z.S. 1856, p. 207. Like the Mogador species, somewhat shorter and broader. 10-20 fm. *Cp.*" [Carpenter, 1864b, p. 661]

A copy of the original description with translation was published by Oldroyd (1927). In the first line of that copy the word "sutura" should be inserted before the word "celata." The following should be added to make the copy of the original notes complete:

"... div. 120°.

"*Hab.* Sta. Barbara, rarissime (*Col. Jewett*). Mus. Gould.

"Closely resembling the small white species from the Panama, W. Indian and N. African provinces; but distinguished from all in shape and plications." [Carpenter, 1856d, p. 207]

In the Redpath Museum, there are 10 specimens of this species in the Carpenter Collection mounted on glass and labelled by Carpenter as "Gibberula Jewettii Cpr. type Sta. Barbara Jewett." These are the only specimens found so far which have been definitely labelled by Carpenter with the data corresponding with that of the original description.

At the New York State Museum in the Gould Collection, A4268, there is a shell which William Marshall, when arranging the collection, felt might be the type of this species. The label with the specimen reads "Sta. Barbara No. 30 very rare *Marginella* new" with notation "appears like Cooper's handwriting." Carpenter records in his original description that a specimen was in the Gould Collection. The New York State specimen is not listed in the catalogue of Gould "types" (27th Ann. Rept. State Mus. Nat. Hist., 1874, p. 47), so that the shell was not regarded as a "type" when it was turned over to the New York State Museum. The writer includes a photograph of the specimen. It might be the one referred to. If syntypes had not been found, it would be available for neotype designation.

Oldroyd (1927) stated incorrectly that the type is in the British Museum, and Tomlin, followed by Grant and Gale, stated erroneously that the type is in the U. S. National Museum.

The illustration in Reeve (copied by Tryon) does not depict *C. jewetti*. The figure by Williamson (also Baily, 1935, fig. 212) represents a typical form.

*Syntypes*.—Redpath Museum, No. 80

*Distribution*.—Recent. Santa Barbara, California (type); Monterey, California, to San Martin, Lower California (Burch). Pleistocene. California (Arnold; Oldroyd; Chaces; Woodring, Bramlette, and Kew); Mexico (Jordan)

**Cystiscus regularis** (Carpenter)

(Pl. 24, figs. 9-12)

*Marginella regularis* CARPENTER, 1864b, p. 537, 661; Reprint, 1872, p. 23, 147; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 398; Reprint, 1872, p. 287; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 36; 1870, Amer. Jour. Conch., vol. VI, p. 68; TRYON, 1883, Man. Conch., vol. V, p. 43, pl. 12, fig. 56; KEEP, 1887, West Coast Shells, p. 43; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 212; DALL, 1921, p. 85; OLDROYD, 1927, vol. II, pt. 1, p. 164; BAILY, 1935, West Coast Shells (Keep), p. 222; KEEN, 1937, p. 39; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 185

*Hyalina* (*Cystiscus*) *regularis* (Carpenter), GRANT AND GALE, 1931, p. 631

*Cystiscus regularis* (Carpenter), BURCH, 1945, no. 49, p. 24, 26

*Persicula* (*Gibberula*) *regularis* (Carpenter), ABBOTT, 1954, p. 258

"Between *Jewettii* and *minor*, C. B. Ad. Maz. Cat. no. 587. Beach—20 fm. *Cp.*" [Carpenter, 1864b, p. 661]

Oldroyd (1927) published a copy of Carpenter's (1865) description. The following should be changed in her copy:

Add:

"... div. 120°.

Delete "poll."

"*Hab.* Sta. Barbara (*Jewett*); coast of California south from Monterey, beach to 20 fathoms; Catalina Island, 10-20 fathoms, State Coll. no. 398a (*Cooper*)." [Carpenter, 1865h, p. 398]

Specimens marked type of this species have been found in the Redpath Museum, McGill University, and the U. S. National Museum. Those at McGill were labelled by Carpenter "type" S. Diego Monterey," and there are six specimens.

The specimens at the U. S. National Museum is labelled "type Cpr. [Cp.] 398 Sta. Barbara Jewett." This specimen represents the first mentioned of the seven syntypes available. The locality of this shell is definite, whereas that of the McGill specimens is not. The writer therefore selects the U. S. National Museum specimen, no. 55391 (pl. 24, figs. 11, 12,) as the lectotype. This makes Santa Barbara the type locality.

The reference in Oldroyd and others to the type depository as the British Museum is incorrect.

There is probably a finer sixth plication on the columella than is conspicuous in the photographs.

*Types*.—Lectotypes, U. S. National Museum, no. 55391; paratypes (6), Redpath Museum, no. 82

*Distribution*.—Recent. Santa Barbara, California (type). Pleistocene. California (Grant and Gale) Mexico (Jordan, 1926)

**Cystiscus subtrigona** (Carpenter)

(Pl. 26, figs. 3-4)

*Marginella subtrigona* CARPENTER, 1864b, p. 537, 661; Reprint, 1872, p. 23, 147; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 397; Reprint, 1872, p. 287; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 36; TRYON, 1883, Man. Conch., vol. V, p. 43, pl. 12, fig. 55; KEEP, 1887, West Coast Shells, p. 43; DALL, 1921, p. 85; OLDROYD, 1927, vol. II, pt. I, p. 164; BAILY, 1935, West Coast Shells (Keep), p. 222; KEEN, 1937, p. 39

*Hyalina* (*Cystiscus*) *subtrigona* (Carpenter), GRANT AND GALE, 1931, p. 631

*Cystiscus subtrigona* (Carpenter), BURCH, 1945, no. 49, p. 24, 26

*Persicula* (*Gibberula*) *subtrigona* (Carpenter), ABBOTT, 1954, p. 258

"Shape of *Erato columbella*." [Carpenter, 1864b, p. 661]

Oldroyd (1927) published a copy of Carpenter's description (1865). The following corrections should be made in her copy:

Line 1: add "latiore" between "curtiore" and the semicolon; correct "parientali" to "parietali"; add at the end, "div. 130°. *Hab.* Sta. Barbara (*Jewett*)." Delete "poll."

The holotype and "paratype" of this species are in the Carpenter Collection in the Redpath Museum intact on the Carpenter original mount, with the original label, "*Gibberula*

subtrigona Cpr.\* type Sta. Barbara Jewett Monterey." Figures are included of both specimens. The holotype (specimen marked\* by Carpenter) has denticulations on the interior of the labrum, as will readily be seen. Those on the labrum of the "paratype" are less pronounced but visible. The angle of spire, particularly the right side, of the "paratype" is greater than that of the holotype, the body whorl is broader, and the character of the plications on the inner lip is different. The "paratype" does not belong to the same species and should be separated. It is recorded here only as original reference (Pl. 26, fig. 5).

Oldroyd's statement, followed by Grant and Gale, that the type is in the British Museum is incorrect.

*Types*.—Holotype and "paratype", Redpath Museum, no. 81

*Distribution*.—Recent. Santa Barbara, California (type); Monterey to San Diego, California (Dall), to San Martin, Lower California (Burch). Pleistocene. California (Oldroyd, 1925; Grant and Gale)

#### Family CANCELLARIIDAE

#### Genus *Admete* Krøyer (in Möller)

*Admete* KRØYER in MÖLLER,<sup>109</sup> 1842, Index Moll. Groenlandiae, p. 15; 1842, Naturhist. Tidsskr., 4 (1), p. 88

Type species by monotypy *Admete crispa* MÖLLER, 1842, = *A. viridula* (Fabricius), FABRICIUS, 1780, Fauna Groenlandica, p. 402 as *Tritonium*; Recent. Northern Atlantic. TRYON, 1885, Man. Conch., vol. VII, pl. 7, figs. 23-28; KOBELT, 1887, Syst. Conchyl.—Cab. Martini and Chemnitz, genus *Admete*, pl. 24, figs. 1-7

*Distribution of genus*.—Pliocene—Recent

#### *Admete gracilior* (Carpenter in Gabb)

(Pl. 26, figs. 6, 7)

*Cancellaria gracilior* CARPENTER in GABB, 1869, Pal. Geol. Sur. California, vol. II, p. 50; COOPER, 1888, 7th Ann. Rept. California State Min. Bur., p. 231

*Admete gracilior* (Carpenter), ARNOLD, 1903, p. 219, pl. VII, fig. 4; KEEN, 1937, p. 28 Recent; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 77  
*Admete couthoueyi gracilior* (Carpenter), DALL, 1921, p. 84; OLDROYD, 1927, vol. II, pt. I, p. 158

[Cf. *Admete modesta gracilior* (Carpenter), GRANT AND GALE, 1931, p. 623, pl. 23, fig. 5  
*Massyla (Massyla) gracilior* (Carpenter), BURCH, 1945, no. 49, p. 9, 11

Oldroyd (1927) republished Carpenter's original description with a translation. The following should be changed in her copy.

Delete "in."

Add:

"... div. 38.""

"Hab. Santa Barbara, Post-Pliocene. Of this extremely elegant species, two specimens were found by Mr. Gabb, of which one is very perfect. It greatly resembles *C. modesta* from Neeah Bay, but is much more slender. The nucleus is chrysodermoid, very slanting, with sunken spire." [Carpenter, in Gabb, 1869, p. 50]

The specimens by which Grant and Gale and Burch illustrated *A. modesta* are not of typical *A. modesta*. Both pictures seem to represent the same group as that of the individual figured by Arnold as *A. gracilior*. Grant and Gale described theirs as possibly *A. gracilior* of Carpenter but not of Arnold.

*Dimensions*.—Holotype: 8.8 mm. height; 4.5 mm. width. Paratype; 7.5 mm. height; 3.8 mm. width

*Holotype*.—Museum of Paleontology, University of California, no. 15530; paratype, same depository, no. 15531

*Distribution*.—Pleistocene. Santa Barbara, California (type). Lower Pleistocene. Timms Point silt, Lomita marl, San Pedro sand. Upper Pleistocene. Palos Verdes sand (Woodring, Bramlette, and Kew). Until more knowledge of this species is available the writer is omitting the Recent range, as given by Dall (1921).

<sup>109</sup> Möller credited the genus to Krøyer.

*Admete modesta* (Carpenter)

(Pl. 24, figs. 17, 18)

*Cancellaria modesta* CARPENTER, 1864b, p. 628, 660; Reprint, 1872, p. 114, 146; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 32; Reprint, 1872, p. 245; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 35; TRYON, 1885, Man. Conch., vol. VII, p. 84; KEEN, 1937, p. 32

*Cancellaria (Sveltia) modesta* (Carpenter), DALL, 1921, p. 84; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 24, p. 86; 1927, vol. II, pt. I, p. 154

*Admete modesta* (Carpenter), GRANT AND GALE, 1931, p. 622 in part, not pl. 27, fig. 5

*Massyla (Massyla) modesta* (Carpenter), BURCH, 1945, no. 49, p. 8, 10 not p. 47, pl. III, fig. 13

"Like *Trichotropis borealis*, with two slanting plaits and spiral ribs travelling up the paries. See also p. 615, nos. 463, 817." [Carpenter, 1864b, p. 660]

Oldroyd (1927) republished a copy of Carpenter's description (1865). The last word, "in.", should be deleted from that copy and "div. 50" inserted. The following should be added to make the copy complete:

"Hab. Neeah Bay; one specimen and one fragment. (*Swan*)." [Carpenter, 1865a, p. 32]

The holotype is a worn specimen in the U. S. National Museum with an original Carpenter label, "Type Neeah Bay [*sic*] W. T. J. G. Swan." The apical whorls are badly decorticated. The spiral ribs are coarse, 4 on the penultimate whorl, and about 11 on the whole of the body whorl. There are finer, intervening spiral ribs on the first three primary spiral ribs of the body whorl. Apparently Carpenter counted only the 7 major spiral ribs on the body whorl. That number as given by Carpenter would coincide with such on the type. The holotype is worn, but there is no evidence that longitudinal ribs ever existed. There are two primary columellar folds.

The individual figured by Burch seems to belong to the same group as the one illustrated by Grant and Gale, which they suggested might be *A. gracilior* (a "variety").

*Holotype*.—U. S. National Museum, no. 16238

*Distribution*.—Neah Bay, Washington (type); Aleutian Islands, Alaska, to Neah Bay and Puget Sound, Washington (Dall)

## Family TEREBRIDAE

Genus *Terebra* Bruguière, 1789

*Terebra* BRUGUIÈRE, 1789, Encyclopèdia Méthodique, Hist. Nat. des Vers, vol. 1, Index, p. XV; DESHAYES, 1816, vol. 3, pl. 402; DODGE, 1947, Jour. Paleont., vol. 21, no. 5, p. 488

Type species by monotypy, LAMARCK, 1799, Soc. hist. nat. Paris, Mem., p. 71 *Buccinum subulatum* LINNAEUS, 1767, Syst. Nat., 12ed., p. 1205. Living. Indo-Pacific. TRYON, 1885, Man. Conch., vol. VII, p. 10, pl. 1, fig. 3; pl. 3, fig. 35

Subgenus *Strioterebrum* Sacco, 1891

*Strioterebrum* SACCO, 1891, Molluschi dei Terreni Terziarii del Piemonte e della Liguria, pt. 10, p. 33

Type species by original designation, *Terebra basteroti* NYST, 1845, Descr. Coq. Polyp. foss. Belgique, Mem. cour. Acad., t. XVII, p. 582; Miocene. France. Italy. SACCO, 1891, Moll. Terr. Terz. Piemonte Liguria, pt. 10, pl. II, fig. 1

*Terebra* (*Strioterebrum*) "*Philippiana*" Dall

(Pl. 21, figs. 11, 12)

*Myurella simplex* CARPENTER, 1864b, p. 537, 614, 657; Reprint, 1872, p. 23, 100, 143; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 395; Reprint, 1872, p. 285; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 31; KEEP, 1887, West Coast Shells, p. 56, not fig. 40 if the drawing is correct; BAILY, 1935, West Coast Shells (KEEP), p. 265, not fig. 283 copy of original.

*Terebra variegata* Gray, TRYON, 1885, Man. Conch., vol. VII, p. 14 in part

*Terebra (Acus) simplex* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 207; ARNOLD, 1903, p. 198

*Terebra (Strioterebrum) pedroanum philippianum* DALL, 1921 [not 1920], p. 67 new name for *Terebra simplex* CARPENTER 1865 not CONRAD, 1830, Acad. Nat. Sci. Philadelphia, Jour., ser. I, vol. VI, p. 226; OLDROYD, 1927, vol. II, pt. 1, p. 60

Not *Terebra philippiana* DESHAYES, 1859, Zool. Soc. London, Proc., p. 289

- Terebra (Strioterebrum) albocincta* Carpenter var. *pedroana* Dall, GRANT AND GALE, 1931, p. 469, pl. 24, figs. 18, 24 variants, see for additional references  
*Terebra (Strioterebrum) pedroana* Dall, WILLETT, 1937, San Diego Soc. Nat. Hist., Trans., vol. VIII, no. 30, p. 393  
*Terebra philippiana* Dall, KEEN, 1937, p. 46  
*Terebra (Strioterebrum) pedroana philippiana* Dall, BURCH, 1945, no. 48, p. 18, 19  
*Terebra pedroana "philippiana"* Dall, WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Nat. Mus., Prof. Paper 207, p. 78

"Very variable in sculpture, as befits the species which forms the northern limit of a group common between the tropics. Col. Jewett's shell was in poor condition, and supposed to be the young of a Gulf species." [Carpenter, 1864b, p. 614]

Carpenter's description (1865) of this species was republished by Oldroyd (1927, p. 69). The following should be added to make that copy complete:

"Long. 1.03, long. spir. .76, lat. .27, div. 20°.

"Variat tuberculis subobsoletis.

"Hab. Sta. Barbara (Jewett); S. Pedro (Cooper). [Carpenter, 1865h, p. 395]

The holotype of this species is a plump shell with the apical whorls broken and worn. The nodes are strong on the sutural collar. Below the nodose area are four or five spiral lines which are lacking just above the suture. There are more spiral lines on the upper whorls of the spire. The spiral lines are also present on the basal angle of the body whorl. The longitudinal ribs are stronger on the upper whorls.

The holotype<sup>110</sup> bears the label "San Pedro J. G. Cooper", which identifies the specimen as the second one mentioned by Carpenter. Because the exact relationship of this species and its nomenclature are still unsettled (its specific name is preoccupied, and apparently papers are in manuscript in regard to these points) the writer merely lists the species under Dall's preoccupied name.

*Holotype*.—U. S. National Museum, no. 4943

*Distribution*.—Recent. San Pedro, California (type); San Pedro, California, to Gulf of California (Dall). Pleistocene, California; (Arnold; Grant and Gale; Willett; Woodring, Bramlette, and Kew); Mexico (Jordan, 1926)

*Terebra albocincta*, *T. Hindsii*, *T. subnodosa*, and *T. rufocinera* were all described by Carpenter in the Catalogue of the Reigen Collection of Mazatlan Mollusca (1857) and properly belong in the report on the illustration of the types of that catalogue. The types of the new species described in that catalogue are in the British Museum.

#### Family TURRIDAE

#### Genus *Ophiodermella* Bartsch, 1944

*Ophiodermella* BARTSCH, 1944, Biol. Soc. Washington, Proc., vol. 57, p. 61

Type species by original designation, *Ophiodermella ophioderma* (Dall) = *Surcula ophioderma* DALL, 1908, U. S. Nat. Mus., Proc., vol. 34, no. 1610, p. 247 new name for *Pleurotoma incermis* HINDS, 1843, Zool. Soc. London, Proc., p. 37; 1844, Voy. Sulphur, Moll., p. 16, pl. V, fig. 7. Not *P. incermis* PARTSCH, 1842, Neue Aufst. der Petref.—Samml. des. K. K. Hof.-Miner.—Cab. Nr. 960, 1842 *vide* HÖRNES, 1856, Abh. K. K. Geol. Reich., Bd. III, p. 349. Recent. Baulinas Bay, California, to Ballenas Lagoon, Lower California (Dall, 1921)

#### *Ophiodermella cancellata* (Carpenter)

(*O. rhines* Dall, 1908)

*Drillia cancellata* CARPENTER, 1864b, p. 603, 658; Reprint, 1872, p. 89, 144; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 63; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; TRYON, 1884, Man. Conch., vol. VI, p. 183; ARNOLD, 1903, p. 204

*Surcula rhines* DALL, 1908, U. S. Nat. Mus., Proc., vol. 34, no. 1610, p. 247, 248 new name for *Drillia cancellata* CARPENTER, 1865

*Moniliopsis cancellata* (Carpenter), DALL, 1918, U. S. Nat. Mus., Proc., vol. 54, p. 318

<sup>110</sup> There are several minor errors in the literature in connection with the record of this species which special attention may help to clear up: The date of *T. philippiana* Dall is 1921, not 1920; holotype of *T. simplex* is in the U. S. National Museum, not in the British Museum; the type locality is San Pedro, California, and not Santa Barbara, California.

- Moniliopsis rhines* (Dall), DALL, 1919, U. S. Nat. Mus., Proc., vol. 56, no. 2288, p. 28, pl. 8, fig. 5  
*Clathrodrillia* (*Moniliopsis*) *rhines* DALL, 1921, p. 70; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 76, pl. 5, fig. 4 figure obscure, difficult to determine; 1927, vol. II, pt. 1, p. 74  
*Moniliopsis incisa* (Carpenter), GRANT AND GALE, 1931, p. 565 *D. cancellata* in part  
*Clathrodrillia rhines* (Dall), KEEN, 1937, p. 33  
*Ophioidermella rhines* (Dall), BURCH, 1946, no. 62, p. 10

"*Drillia\* cancellata*, ? n.s. Like the young of *incisa*, but nodosely cancellated." [Carpenter, 1864b, p. 658]

\*\*A peculiar group of species, resembling *Clionella* (Marine, testa *Stimpson*)." ]

Carpenter's description (1865) of this species was republished by Oldroyd (1927) under *Clathrodrillia rhines* Dall. The following line should be added to complete that copy:

"*Hab.* In sinu Pugetiano duo specimina legit Kennerley: quorum altero labium subcallosum, altero planatum." [Carpenter, 1865e, p. 63]

Dall renamed *Drillia cancellata* Carpenter because he considered there were turrids with the same specific name. However, the original names other than Carpenter were:

- Pleurotoma cancellata* EICHWALD, 1830, Nat. Lithuæni, p. 225; DESHAYES, 1834, Descrip. Coq. foss. Paris, II, p. 474; CALCARA, 1839, Ricerche Malac., p. 5; H. C. LEA, 1841, Amer. Jour. Sci., vol. XL, p. 98; (Sowerby), Wood, 1842, Ann. Mag. Nat. Hist., vol. IX, p. 542; GRAY in REEVE, 1846, Icon Conch., vol. I, *Pleurotoma*, pl. XXXV, fig. 317. See Sherborn, 1924, Index animalium, pt. V, p. 1033

These would not preoccupy *Drillia cancellata* Carpenter. That is, Carpenter's name is not a primary homonym. Until any of the turrids of the previously named *cancellata* is placed in the same genus as *Drillia cancellata* (*Ophioidermella* at present) Carpenter's name is not a secondary homonym and may stand.

Dall (1908; 1919) rejected the name as a secondary homonym, which might be the basis for the validity of his new name. However, his basis for claiming homonymy was not correct.

If the specimen which Dall used for the illustration of *Moniliopsis rhines* (Dall) (1919, pl. 8, fig. 5) is considered not the same as *O. cancellata* (Carpenter), then that specimen (U. S. National Museum) would become the holotype of *M. rhines* Dall. Unfortunately the holotype of *O. cancellata* (Carpenter) has not been found.

The problem of the identity of this species remains unsettled until analyzed in the light of Bartsch's unpublished turrid paper.

*Type*.—Not found

*Distribution*.—Puget Sound, Washington (type), British Columbia, to San Diego, California (Burch)

#### *Ophioidermella incisa* (Carpenter)

- Drillia incisa* CARPENTER, 1864b, p. 603, 657, 658; Reprint, 1872, p. 89, 143, 144; 1865, Acad. Sci. Philadelphia, Proc., vol. 17, p. 62; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 31; TRYON, 1884, Man. Conch., vol. VI, p. 182, pl. 12, fig. 41  
*Turris incisa* (Carpenter), PACKARD, 1918, Univ. California Pub. Zool., vol. 14, no. 2, p. 342, pl. 41, figs. 2a, 2b  
*Moniliopsis incisa* (Carpenter), DALL, 1919, U. S. Nat. Mus., Proc., vol. 56, no. 2288, p. 28, pl. 12, fig. 7; GRANT AND GALE, 1931, p. 565 in part, pl. 26, fig. 21; BAILY, 1935, West Coast Shells (KEEP), p. 262; WILLET, 1937, San Diego Soc. Nat. Hist., Trans. vol. VIII, no. 30, p. 394  
*Clathrodrillia* (*Moniliopsis*) *incisa* (Carpenter), DALL, 1921, p. 70; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 75, pl. 18, fig. 4 not 3 same fig. as DALL, 1919; OLDROYD, 1927, vol. II, pt. 1, p. 72, pl. 18, fig. 3 same fig. as DALL, 1919 and OLDROYD, 1924  
*Ophioidermella incisa* (Carpenter), BARTSCH, 1944, Biol. Soc. Washington, Proc., vol. 57, p. 62; BURCH, 1946, no. 62, p. 10.

"Like *inermis*: spiral sculpture grooved, not raised." [Carpenter, 1864b, p. 657]



Carpenter's description (1865) was republished by Oldroyd (1927). The following should be changed in her copy.

Line 2, p. 73, read .4 for 04.

Add:

“. . . , div. 30°.

"*Hab.* In sinu Pugetiano legit Kennerley: prope 'Neeah Bay' legerunt Swannii Indianuli. "A *Drillia* typicis sinu minimo et operculo haud angulato conspicue differt: Clionellae, Grayi, magis convenit." [Carpenter, 1865e, p. 63]

Oldroyd's copy (1927, p. 73) of Tryon (not Pilsbry) should be corrected to read "form like the preceding [*D. inermis* not *C. ophiderma*] species."

The name *Drillia incisa* Carpenter is not preoccupied by *Pleurotoma incisa* Reeve, 1843, unless the latter belongs in the genus *Ophiidermella* in which *D. incisa* is at present placed.

The study of the West Coast turrids was in manuscript form by Bartsch; figures are not included herein.

*Type*.—U. S. National Museum, no. 6320<sup>111</sup>

*Distribution*.—Recent. Neah Bay, Washington (type); Puget Sound, Washington, to San Pedro, California (Dall). Pleistocene (see Grant and Gale, 1931)

#### Genus *Cytharella* Monterosato, 1875

*Cytharella* MONTEROSATO, 1875, Bol. Soc. Malac. Italiana, vol. 1, p. 1

Type species by subsequent designation, WOODRING, 1928, Carnegie Inst. Washington, Pub. no. 385, p. 168; *Murex costatus* DONOVAN, 1803, Nat. Hist. Brit. Shells, vol. 5, pl. 179, fig. 4; CHENU, 1845, Bib. Conchyl., vol. 1, p. 68, pl. 24, figs. 4-7. Recent. Europe. TRYON, 1884, Man. Conch., vol. VI, pl. 21, fig. 8; pl. 22, fig. 42 = *C. septangularis* Montagu, 1803

#### *Cytharella aculea* Dall

*Cytharella aculea* Dall (1919, p. 74) was named by Dall from a manuscript label of the specific name of Carpenter. The label of Carpenter might, therefore, be found in old collections.

#### Subgenus *Agathotoma* Cossmann, 1899<sup>112</sup>

COSSMANN, 1899, Rev. crit. Paléozool., vol. 3, no. 1, p. 45 new name for *Ditoma* BELLARDI, 1878, Mem. Accad. Torino, ser. 2, vol. 29, p. 295. Not *Ditoma* ILLIGER, 1807, see NEAVE, 1939-1940

Type species by monotypy *Mangilia augusta* (JAN) in SISMONDA, 1842, Syn. An. Invert. Pedemontii foss., p. 34 *vide* BELLARDI, 1878, Mem. Accad. Torino, ser. 2, vol. 29, pl. VIII, fig. 40. Miocene and Pliocene. Italy. Bellardi, COSSMANN, 1896, Essais Paléonch. comp., liv. 2, pl. VII, figs. 28-30

#### *Cytharella (Agathotoma) fusconotata* (Carpenter)

*Cithara fusconotata* CARPENTER, 1864, July, Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 46; Reprint, 1872, p. 218; 1864b, Aug., 618; Reprint, 1872, p. 104

*Mangilia fusconotata* (Carpenter), TRYON, 1884, Man. Conch., vol. VI, p. 271 section *Cythara*

*Cytharella (Agathotoma) fusconotata* (Carpenter), DALL, 1921, p. 83; OLDROYD, 1927, vol. II, pt. 1, p. 148; KEEN, 1937, p. 34; BURCH, 1946, no. 62, p. 31

A copy of the original description was republished by Oldroyd (1927). The following should be added to complete the original notes:

“. . . div. 40°."

*Type*.—U. S. National Museum, no. 4081

*Distribution*.—Cape San Lucas, Lower California (type); Laguna Beach, California, to Gulf of California (Dall)

<sup>111</sup> Grant and Gale (1931) incorrectly gave the type depository as Academy Natural Sciences, Philadelphia.

<sup>112</sup> A typographical error in Dall (1921, p. 83) gave the year as 1889. The incorrect date has inadvertently been copied by later authors.

**Clathrodrillia limans** Dall

*Clathrodrillia limans* Dall (1919, p. 14) consisted of a manuscript specific name of Carpenter which was utilized by Dall. Carpenter labelled a specimen which he identified for Stearns. The name might be found on labels in Stearns material as of Carpenter.

**Cymatosyrinx hecuba** Dall

*Cymatosyrinx hecuba* Dall (1919, p. 9) is the name given by Dall for a species which bore the manuscript specific name of "*rosacea*" by Carpenter. Dall changed the name because of the prior use of "*rosacea*" for a turrid by Mighels (1845)

**Genus Clathurella** Carpenter, 1857

*Clathurella* CARPENTER, 1857, Mazatlan Cat., p. 399, proposed for *Defrancia* MILLET, 1826, not *Defrancia* BRONN, 1825, nor MÖLLER, 1842, for references see NEAVE (1939-40)

Type species by subsequent designation, COSSMANN, 1896, Essais Paléoconch. comp., liv. 2, p. 121; *Clavatula rava* HINDS, 1844, Voy. Sulphur, Zool., Moll., p. 17, pl. V, fig. 18. Living. Central America.

Bronn (1831) proposed *Pleurotomioidea* for *Defrancia* Millet (1826) not Bronn (1825). Bronn's name has priority over *Clathurella* Carpenter (1857). A nomenclatorial tangle ensues concerning whether Carpenter's replacement name should be disregarded or should be validated by one of the species which was included at the time of its use by Carpenter. If the latter is allowed it could be used with *C. rava* (Hinds) as type species. See Iredale (1917, p. 326) and Grant and Gale (1931, p. 604) for discussion.

**Genus Mangelia** (Leach ms.) Risso, 1826

(*Mangilia* auct.)

*Mangelia* Risso, 1826, Hist. Nat. Eur. Merid., vol. 4, p. 219 "Leach MS."; WOODRING, 1928, Carnegie Inst. Washington, Pub. no. 385, p. 177; GRANT AND GALE, 1931, p. 585

Type species by subsequent designation, HERRMANNSEN, 1852, Indicis Gen. Malacoozorum, Suppl., p. 80; *M. striolata* RISSO, 1826, Hist. Nat. Eur. Merid., vol. 4, p. 221, pl. 8, fig. 101. Recent and "subfossil." Mediterranean. GRANT AND GALE, 1931, pl. 25, fig. 18 copy of Risso, 1826, pl. 25, figs. 19a, 19b copy KIENER, 1840, Spec. Gen. et Icon. Coq. Viv., vol. *Pleurotoma*, pl. 27, fig. 1 *Pleurotoma villiersii* Michaud = *M. striolata* Risso.

One questions the status of Herrmannsen's type designation. For purposes of this paper and in the interest of stability the writer follows the use of Herrmannsen's type designation for *Mangelia*: "(Leach mscr.) Gray, 1847" = *Mangelia* Risso.

"-*Mangelia* Riss.—Leach mscr., t. Gray 1847 Ann. Mag. N. H. XX., g. Purpuridarum. -Synom. adde: Buccinum sp. Da Costa; Murex sp. Mont.; Fusus sp. Fleml., Bronn; Pleurotoma sp. Blv., Phil.; Manzelia Aud.; Raphitoma p.p. Bell.

"*Mangelia* (Leach mscr.) Gray 1847 Zool. Proc. 134, g. Coninorum, restrictum ad typicum *M. striolatae* Riss." [Herrmannsen, 1852, p. 80]

**Mangelia barbarentis** Oldroyd

(Pl. 25, figs. 13, 14)

*M. angulata* CARPENTER, 1864b, p. 537, 603, 658; Reprint, 1872, p. 23, 89, 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 395; Reprint, 1872, p. 284; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; 1870, Amer. Jour. Conch., vol. VI, p. 65; KEEP, 1887, West Coast Shells, p. 55; not *Mangelia angulata* REEVE, 1846, Conch. Icon., vol. 3, *Mangelia*, pl. 8, fig. 62

*Mangilia angulata* (Carpenter), ARNOLD, 1903, p. 212, pl. VII, fig. 9; DALL, 1921, p. 79; not PACKARD, 1918, Univ. California Pub. Zoology, vol. 14, p. 344, pl. 39, figs. 10a, 10b  
*Mangilia barbarentis* OLDROYD, 1924, Pub. Puget Sound Biol. Station, p. 82; OLDROYD, 1927, vol. II, pt. I, p. 132 new name for *M. angulata* CARPENTER not REEVE; BAILY, 1935, West Coast Shells (KEEP), p. 263; KEEN, 1937, p. 39; BURCH, 1946, no. 62, p. 27 in synonymy of *M. variegata*; SMITH AND GORDON, 1948, California Acad. Sci. Proc., ser. 4, vol. XXVI, p. 184, 233

*Mangilia variegata* Carpenter, WILLETT, 1937, San Diego Soc. Nat. Hist., Trans., vol. VIII, no. 30, p. 394, pl. 26, fig. 1 *M. angulata* in synonymy of.

"Shape of *variegata*, but brown, whirls broad, angular." [Carpenter, 1864b, p. 658]

A copy of Carpenter's description (1865) has been published by Oldroyd (1927). The following should be changed in her copy:

Delete "in" last line

Add:

"... div. 30°.

"Hab. Sta. Barbara (*Jewett*)."<sup>113</sup> [Carpenter, 1865h, p. 395]

The only type material found consists of three specimens in the Redpath Museum, on original Carpenter glass mounts with a Carpenter label, "? type Sta. Barbara Jewett." Apparently Carpenter was not sure of these specimens as types. But in lieu of the presence of specimens with better qualifications the writer retains these specimens as the syntypes.

There is a difference of opinion as to the synonymy of *M. variegata*, *M. angulata* (*barbarensis*), *M. vitens* (*pulchrior*), *M. hecetae* Dall and Bartsch, *M. beta* Dall, and others. (See Grant and Gale, 1931, p. 594; Willett, 1937, p. 394.)

Grant and Gale placed *M. angulata* as equal to *M. hecetae* Dall and Bartsch (1910, p. 10, pl. 1, fig. 6)<sup>113</sup> which would eliminate the replacement name of *M. barbarensis* by Oldroyd. Willett has shown by a series of intergradations that probably *M. angulata* and *M. variegata* are the same species. Since the name *M. angulata* is preoccupied the specific name could stand as *M. variegata*.

Smith and Gordon (1948) retained *M. barbarensis* (*M. angulata*), *M. hecetae*, and *M. variegata* as distinct species.

For the purpose of this report the writer compiled the data under each name. Bartsch's monograph will shed critical light on the subject.

*Syntypes*.—Redpath Museum,<sup>114</sup> no. 90

*Distribution*.—Recent. Santa Barbara, California (type); Puget Sound, Washington, to Gulf of California (Dall). Pleistocene. California (Arnold; Oldroyd, 1925; Willett). Mexico (Jordan, 1926)

#### *Mangilia crebricostata* Carpenter

*Mangilia crebricostata* CARPENTER, 1864b, p. 628; Reprint, 1872, p. 114, 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 28; Reprint 1872, p. 242; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; KEEN, 1937, p. 39

*Mangilia crebricostata* (Carpenter), DALL AND BARTSCH, 1913, Canada Geol. Sur., Victoria Mem. Mus., Bull. no. 1, p. 140, pl. X, fig. 3; DALL, 1921, p. 82; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 85; 1927, vol. II, pt. I, p. 145; pt. II, pl. 61, fig. 3 not pl. 15 as stated in text, copy of DALL AND BARTSCH, 1913

Cf. *Mangilia newcombei* DALL, 1919, U. S. Nat. Mus., Proc., vol. 56, no. 2688, p. 71, pl. 21, fig. 4; 1921, p. 81; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 83; 1927, vol. II, pt. I, p. 141

*Mangilia* (*Bela*) *crebricostata* (Carpenter), GRANT AND GALE, 1931, p. 593

"*Mangilia*" *crebricostata* Carpenter, BURCH, 1946, no. 62, p. 27

A copy with translation of Carpenter's description (1865) of this species was published by Oldroyd (1927). Her copy should be corrected as follows: "... nucl. ? . . ." Delete "poll" from the last line and substitute "div. 28°." The following should be added to complete Oldroyd's copy:

"Hab. Neeah Bay; 1 specimen (*Swan*)."<sup>114</sup> [Carpenter, 1865a, p. 29]

The type of this species is in the U. S. National Museum and will be reported on by Bartsch in his monograph in preparation. Dall and Bartsch (1913) discussed in detail and figured as a representative of the species, a shell from Skidegate Inlet, Queen Charlotte Island, B. C.

<sup>113</sup> Through the courtesy of F. L. Alcock, Curator, National Museum of Canada, Ottawa. information in regard to the types of the species described by Dall and Bartsch (1910) was furnished. The type of *M. hecetae* is no. 1381 N.M.C.

<sup>114</sup> The statement in Oldroyd, followed by Grant and Gale, that the types are in British Museum should be corrected.

Grant and Gale made a feasible suggestion in uniting *M. newcombei* Dall (1919), also from Vancouver Island, with *M. crebricostata* Carpenter. The figure of the holotype of *M. newcombei* is similar to the figure given by Dall and Bartsch of *M. crebricostata*.

*Type*.—U. S. National Museum, no. 15512b

*Distribution*.—Neah Bay, Washington (type); Forrester Island, Alaska, to Puget Sound, Washington, (Dall in part). The Monterey shells previously identified as this species have been placed under *M. hecetae* Dall and Bartsch (Bartsch in Smith and Gordon, 1948, p. 184).

#### ***Mangelia interfossa* Carpenter**

(Pl. 27, figs. 5, 6)

*Mangelia interfossa* CARPENTER, 1864b, p. 628, 658; Reprint, 1872, p. 114, 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 29; Reprint, 1872, p. 242; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; KEEN, 1937, p. 39

*Daphnella interfossa* (Carpenter), TRYON, 1884, Man. Conch., vol. VI, p. 310, pl. 22, fig. 57?;

GRANT AND GALE, 1931, p. 597 suggested = *M. variegata* Carpenter which appears likely

*Mangilia interfossa* (Carpenter), DALL, 1921, p. 82, section *Clathromangilia* [sic]; OLDRYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 85; 1927, vol. II, pt. I, 144 section *Clathromangilia* [sic] [*Clathromangilia*]

*Mangelia* (*Mitromorpha*) *interfossa* (Carpenter), GRANT AND GALE, 1931, p. 597 in part

*Mitromorpha interfossa* (Carpenter), BURCH, 1945, no. 49, p. 33

"*Mangelia*" *interfossa* Carpenter, BURCH, 1946, no. 62, p. 28

"Several dead specimens." [Carpenter, 1864b, p. 628]

"Like *attenuata*, delicately cancellated." [Carpenter, 1864b, p. 658]

A copy of the original description was published by Oldroyd (1927, p. 144). The following should be added to complete that copy:

"Long. .38, long. spir. .22, lat. .13, div. 25°.

"*Hab.* Neeah Bay; very rare (*Swan*)." [Carpenter, 1865a, p. 29]

The type material in the Redpath Museum, labelled type in Carpenter's handwriting on Carpenter's special glass mount, consists of 9 specimens, one of which is not *M. interfossa*.

Figures of two of those specimens are included herein. Carpenter's first mention of the species (1864b, p. 628) stated that there were "several dead specimens."

The shells are light yellow or brownish. The columella and labrum are smooth.

There is also a specimen in the U. S. National Museum, no. 22818, labelled type. With the two suites of syntypes, it is advisable for a lectotype to be selected. Such a selection will depend on the results of Bartsch's work in his monograph of West Coast turrid species.

The *Mitromorpha filosa barbarentis* Arnold (1907a, pl. 11, fig. 1; 1907b, pl. LVII, fig. 1), which Grant and Gale indicated were the same form as this species, does not belong to the same genus if the illustration of Arnold's shell is correct. *M. interfossa* is not a *Mitromorpha*, as thought by Grant and Gale. The difference in shape is readily seen if the figures of the types of *M. interfossa* are compared with that of *M. filosa*, the type species of *Mitromorpha*.

The resemblance to *Mitromorpha aspera*, which Grant and Gale suggested, is only superficial as may be seen by comparing the figures herein of the types of both. The heavy ribbing with pits formed by the intersection of nodose ribs presents sculpture that looks similar, but the shape of the body whorl, aperture, and spire are quite different in both species.

*Syntypes*.—Redpath Museum, no. 94; U. S. National Museum, no. 22818<sup>115</sup>

*Distribution*.—Neah Bay, Washington (type); Vancouver Island, British Columbia, to Catalina Island, California (Dall)

#### **"*Mangelia*" *levidensis* (Carpenter)**

*Mangelia levidensis* CARPENTER, 1864b, p. 603, 658; Reprint, p. 89, 144; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 63; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California,

<sup>115</sup> The statements "type in the British Museum" are incorrect.

p. 32; KEEN, 1937, p. 39; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 184 doubted Monterey record  
*Mangilia levidensis* Carpenter, TRYON, 1884, Man. Conch., vol. VI, p. 251  
*Mangilia funebrate* DALL, 1871, Amer. Jour. Conch., vol. VII, p. 100; 1887, U. S. Nat. Mus., Proc., vol. 9, p. 299; 1921, p. 201 = *M. levidensis*  
*Mangilia (Clathromangilia) levidensis* (Carpenter), DALL, 1919, U. S. Nat. Mus., Proc., vol. 56, p. 62, pl. 21, fig. 1; 1921, p. 82; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 86, pl. 5, fig. 3; pl. 45, fig. 4 copy of DALL, 1919, pl. 21, fig. 1 not type as indicated in expl. pl. of Oldroyd; OLDROYD, 1927, vol. 11, pt. I, p. 144; pl. 2, fig. 21 copy of DALL, 1919

*Lora levidensis* (Carpenter), GRANT AND GALE, 1931, p. 526  
 "Mangelia" *levidensis* Carpenter, BURCH, 1946, no. 62, p. 28

"Stumpy, purplish brown, with rough sculpture." [Carpenter, 1864b, p. 658]  
 Carpenter's description (1865) was republished by Oldroyd (1927). The following correction should be made in her copy: delete the last word "poll." and substitute "div. 27°."  
 The following should be added to make the copy complete:

"*Hab.* In sinu Pugetiano legit Kennerley: prope 'Neeah Bay' collegit, per Indianulos Swan.

"A Mangeliis typicis columella torta differt." [Carpenter, 1865, p. 63]

The material, including the type of this species, was under observation by Bartsch at the time of the work of this report and will be reported on in his study of the turrids. The specimen figured by Dall (1919) is from Port Orchard, Puget Sound (Harald Rehder, personal communication).

*Types*.—U. S. National Museum, no. 4487 (labelled Puget Sound), *M. levidensis* Carpenter; U. S. National Museum, no. 220913 (Sitka, Alaska) (Harald Rehder, personal communication) *M. funebrate* Dall, 1871

*Distribution*.—Puget Sound, Washington (type); Bering Strait to Puget Sound, Washington (Dall in part)

#### ***Mangelia nitens* Carpenter**

(Pl. 28, figs. 1-1A)

*Mangelia [variegata] ? var. nitens* CARPENTER, 1864b, p. 658; Reprint, 1872, p. 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 394; Reprint, 1872, p. 284; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; KEEN, 1937, p. 39

*Daphnella variegata nitens* (Carpenter), TRYON, 1884 Man. Conch., vol. VI, p. 300

*Mangilia (Cythara) variegata* (Carpenter), DALL in WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 208 *nitens* as synonymous

*Mangilia pulchrior* DALL, 1921 [not 1919], p. 81, 201 new name for *M. nitens* Carpenter; Oldroyd, 1927, vol. 11, pt. I, p. 139; BURCH, 1946, no. 62, p. 29

*Mangelia (Bela) variegata* (Carpenter), GRANT AND GALE, 1931, p. 590 in part

*Mangilia variegata* Carpenter, WILLETT, 1937, San Diego Soc. Nat. Hist., Trans., vol. VIII, no. 30, p. 394 *nitens* in synonymy as *pulchrior*: BURCH, 1946, no. 62, p. 29 quotes Willett; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 184, 233 *M. pulchrior* = *M. nitens*

"Glossy: spiral lines almost obsolete." [Carpenter, 1865, p. 658]

Oldroyd (1927) republished the original notes on this species. The word "poll" in the last line of Oldroyd's copy should be deleted and "div. 20°" inserted. The line "*Hab.* Sta. Barbara (*Jewett*), rare." should also be added to complete the copy of original notes.

As Grant and Gale (1931) pointed out, the name *Mangelia nitens* Carpenter was not preoccupied by *Clavatulina nitens* Hinds (1843, p. 41), because that species is not a *Mangelia*. The name *M. pulchrior* Dall is therefore not necessary.

*Syntypes*.—Redpath Museum, no. 93 (3 specimens)

*Distribution*.—Santa Barbara, California (type); Monterey, California, to Magdalena Bay, Lower California (Dall)

#### ***Mangelia variegata* Carpenter**

(Pl. 25, fig. 12)

*Mangelia variegata* CARPENTER, 1864b, p. 537, 658; Reprint, 1872, p. 23, 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 394; Reprint, 1872, p. 284; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; 1870, Amer. Jour. Conch., vol. VI, p. 65; KEEN, 1937, p. 39; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 184

*Daphnella variegata* (Carpenter), TRYON, 1884, Man. Conch., vol. VI, p. 300, pl. 22, fig. 54 if authentic, poor figure

*Mangelia* (*Cythara*) *variegata* (Carpenter), DALL in WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 208

*Mangelia* (*Bela*) *variegata* (Carpenter), GRANT AND GALE, 1931, p. 590; WILLETT, 1937, San Diego Soc. Nat. Hist., Trans., vol. VIII, no. 30, p. 394, pl. 26, fig. 1

"*Mangelia*" *variegata* Carpenter, BURCH, 1946, no. 62, p. 29, 39

"Small, slender, thin, zoned with brown: 9 narrow ribs, strong spiral striae." [Carpenter, 1864b, 658]

"M. teste valde attenuata, tenui, parva, pallide carnea, rufo-fusco normaliter bizonata, interdum unizonata, seu zonis interruptis; vertice nucleoso conspicuo, anfr. uno et dimidio, apice mamillato, anfr. norm. VI., subrotundatis suturis valde impressis; costis radiantibus IX, angustis; costulis spiralibus crebis, validioribus, in spira circ. X, costas superantibus; apertura valde elongata; canali brevi, aperto; labro tenui, juxta suturam conspicue arcuato, labio tenui. Long. .31, long. spir. .17, lat. .1 poll., div. 22°. Variat costis crebrioribus, sculptura minus expressa.

"Hab. Sta. Barbara (Jewett)." [Carpenter, 1865h, p. 394]

A syntype (or syntypes) of this species is in the U. S. National Museum. The types were under study by Bartsch, so that the writer did not examine the specimen. Since there are two suites of types, the U. S. National Museum specimen, because of Bartsch's study, could be designated the lectotype.

A syntype of this species is in the Redpath Museum, McGill University. It is preserved on Carpenter's original glass mount with the label "type Sta. Barbara Jewett," in Carpenter's handwriting.

The character of the specimen and the label check with the original description. Tryon stated that the specimen figured by him was from an original lot. It may have been from a lot segregated and described by Carpenter. Tryon's figure suggests the species and may be a poor illustration. *M. oenoa* Dall (1919, pl. 8, fig. 6) does not appear to be the same as this species, as suggested by Grant and Gale (1931, p. 590).

Grant and Gale are correct in stating that the name *Mangelia variegata* is not preoccupied by the various *Pleurotoma variegata* until one named before 1864 is correctly referred to *Mangelia*.

Willett (1937) regarded several named forms, including *M. angulata* Carpenter, as synonymous with this species. He figured a series of 14 specimens to show intergradation between extremes of form and sculpture. For purposes of type record the writer itemized the data of each Carpenter name separately. Bartsch's studies will reveal their biologic combinations.

*Syntypes*.—U. S. National Museum, no. 11798; Redpath Museum, no. 92

*Distribution*.—Recent Santa Barbara, California (type); Alaska, south to Monterey, California, to Gulf of California (Burch). Pleistocene. California (Grant and Gale; Willett, 1937)

#### Genus *Pseudomelatoma* Dall, 1918

*Pseudomelatoma* DALL, 1918, U. S. Nat. Mus., Proc., vol. 54, no. 2238, p. 317

Type species by original designation, *Pleurotoma penicillata* (Carpenter), CARPENTER, 1865, Jour. de Conchyl. vol. XIII, ser. 3, p. 146. Recent. Lower California

#### *Pseudomelatoma moesta* (Carpenter)

*Drillia moesta* CARPENTER, 1864b, p. 537, 657; Reprint, 1872, p. 23, 143; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 181; Reprint, 1872, p. 283; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32, TRYON, 1884, Man. Conch., vol. VI, p. 183, pl. 12, fig. 38 copy WEINKAUFF in KÜSTER, 1887, Syst. Conch.-Cab. Bd. 4, Abt. 3, pl. 30, fig. 5; KEEP, 1887, 1888, West Coast Shells, p. 56, ? fig. 39 (*D. torosa*)

*Pleurotoma* (? *Drillia*) *moesta* (Carpenter), WEINKAUFF in KÜSTER, 1887, Syst. Conch.-Cab., Bd. 4, Abt. 3, p. 134, pl. 30, figs. 5, 8

*Pseudomelatoma moesta* (Carpenter), DALL, 1921, p. 70; OLDROYD, 1927, vol. II, pt. I, p. 75; KEEN, 1937, p. 44; BURCH, 1946, no. 62, p. 11; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 182 Monterey record doubtful

*Pseudomelatoma penicillata moesta* (Carpenter), GRANT AND GALE, 1931, p. 561

"*Drillia moesta*, n.s. Like large *luctuosa*: middle whirls with long transverse ribs and posterior knobs; adult obsolete." [Carpenter, 1864b, p. 657]

Oldroyd (1927) republished Carpenter's description (1865) of this species. To that copy should be added the following:

"... div. 27°

"Hab. Sta. Barbara (*Jewett*); S. Pedro (Cooper)." [Carpenter, 1865h, p. 182]

*Type*.—U. S. National Museum, no. 14942<sup>116</sup>

*Distribution*.—Santa Barbara, California (type); San Pedro, California, to Cerros Island, Lower California (Burch). Pleistocene, Mexico (Jordan)

#### *Pseudomelatoma torosa* (Carpenter)

*Drillia torosa* CARPENTER, 1864b, p. 657; Reprint, 1872, p. 143; 1865, Jour. de Conchyl., vol. XIII, ser. 3, vol. V, p. 145; Reprint, 1872, p. 313; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; 1870, Amer. Jour. Conch., vol. VI, p. 65; TRYON, 1884, Man. Conch., vol. VI, p. 183, pl. 14, fig. 93; KEEP, 1887, West Coast Shells, p. 56, not fig. 39; ARNOLD, 1903, p. 209; COOPER, 1888, 7th Ann. Rept. California State Min., p. 239

*Pleurotoma (Drillia) torosa* (Carpenter), WEINKAUFF in KÜSTER, 1887, Syst. Conch.-Cab., Bd. 4, Abt. 3, p. 228, pl. 42, fig. 13

*Pseudomelatoma torosa* (Carpenter), DALL, 1921, p. 70; OLDROYD, 1927, vol. II, pt. I, p. 76; GRANT AND GALE, 1931, p. 562, pl. 26, fig. 20; BAILY, 1935, West Coast Shells (KEEP), p. 262, not fig. 277 (same as KEEP, 1887, fig. 39) *vide* GRANT AND GALE; KEEN, 1937, p. 44; BURCH, 1946, no. 62, p. 11; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 182 *aurantia* color form of *torosa*

"*Drillia torosa*, n.s. Whirls rounder, olivaceous: with one row of strong bosses throughout: no posterior knobs." [Carpenter, 1864b, p. 657]

Carpenter's description (1865) has been republished by Oldroyd (1927). The following should be changed in her copy:

Delete "poll"

Add:

"... div. 30°.

"Hab. Monterey, *Taylor, Cooper*.

"Cette espèce, ainsi que d'autres *Pleurotomidae* Californiens, appartient à un groupe particulier, dont le *D. inermis* Hinds, peut-être considéré comme le type. Peut-être ces formes seraient-elles mieux placées dans le sous-genre *Ctionella*, qui est vraiment marin, d'après les observations du docteur Stimpson sur les espèces du cap de Bonne Espérance, et non pas Mélanien, comme l'a supposé le docteur Gray, et comme l'ont dit, après lui, MM. Adams et Chenu." [Carpenter, 1865g, p. 145]

*Holotype*.—U. S. National Museum, no. 3286<sup>117</sup>

*Distribution*.—Monterey, California (type); Monterey, California, to Scammon Lagoon, Lower California (Dall)

#### *Pseudomelatoma torosa aurantia* (Carpenter)

*Drillia* (? *torosa*, var.) *aurantia* CARPENTER, 1864b, p. 657; Reprint, 1872, p. 143; 1865, Jour. de Conchyl., vol. XIII, ser. 3, vol. V, p. 145; Reprint, 1872, p. 313; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; TRYON, 1884, Man. Conch., vol. VI, p. 183

*Pseudomelatoma torosa aurantia* (Carpenter), DALL, 1921, p. 70; OLDROYD, 1927, vol. II, pt. I, p. 76; GRANT AND GALE, 1931, p. 562; KEEN, 1937, p. 44; BURCH, 1946, no. 62, p. 11 believes a color form of *moesta*; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 182 color form of *torosa*

"*Drillia* ? var. *aurantia*. Orange, with sutural riblet and faint spiral sculpture." [Carpenter, 1864b, p. 657]

<sup>116</sup> Oldroyd, followed by others, stated incorrectly that the type is in the British Museum (Natural History)

<sup>117</sup> The depository of the type is not the British Museum as stated in Oldroyd and followed by others.

Oldroyd (1927) republished the description (1865). The following should be added to complete her copy:

“: div. 38°.

“Hab. San Diego, *Cassidy*.—San Pedro, *Cooper*. Les individus des localités méridionales étaient tous en mauvais état, et je ne suis pas encore convaincu qu'ils appartiennent à la même espèce.” [Carpenter, 1865g, p. 145]

*Type*.—U. S. National Museum, no. 15310

*Distribution*.—San Diego, California (type)

#### Genus *Granotoma* Bartsch, 1941

*Granotoma* BARTSCH, 1941, Biol. Soc. Washington, Proc., vol. 54, p. 5

Type species by original designation *Granotoma krausi* Dall = *Bela krausi* (Dall), DALL, 1887, U. S. Nat. Mus., Proc., vol. 9, p. 301, pl. 4, fig. 4. Recent. Alaska. DALL, 1919, U. S. Nat. Mus., Proc., vol. 56, no. 2288, pl. 15, fig. 3; BARTSCH, 1941, Biol. Soc. Washington, Proc., vol. 54, fig. 9

#### *Granotoma excurvata* (Carpenter)

*Bela excurvata* CARPENTER, 1864b, p. 603, 658, 683; Reprint, 1872, p. 89, 144, 169; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 63; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; TRYON, 1884, Man. Conch., vol. VI, p. 223

*Lora excurvata* (Carpenter), DALL, 1919, U. S. Nat. Mus., vol. 56, no. 2288, p. 46, pl. 14, fig. 5; 1921, p. 78; OLDROYD, 1927, vol. II, pt. I, p. 123; KEEN, 1937, p. 38

*Granotoma excurvata* (Carpenter), BURCH, 1946, no. 62, p. 19

“Like *Trevelliana*: stumpy, Chrysalloid.” [Carpenter, 1864b, p. 658]

The original description of this species was republished by Oldroyd (1927). The measurements should be corrected in her copy to: “Long. .28, long. spir. .13, lat. .15, div. 55°.” The following original notes should be added:

“Hab.—In sinu Pugetiano ante decessum prematuram specimen unicum piscavit Kennerley, eheu deploratus!” [Carpenter, 1865e, p. 63]

The type of this species, according to Carpenter, was a premature specimen. It is in the U. S. National Museum. Dall did not state from what locality the shell figured by him (1919) came from. The species has been critically studied by Bartsch and will be reported on in his paper.

*Holotype*.—U. S. National Museum, no. 4493C

*Distribution*.—Puget Sound, Washington (type); Bristol Bay, Bering Sea, to Puget Sound, Washington (Dall)

#### Genus *Propebela* Iredale, 1918

*Propebela* IREDALE, 1918, Malacol. Soc. London, Proc., vol. 13, p. 28, 32

Type species by original designation, *Murex turricula* MONTAGU, 1803, Test. Brit., vol. 1, p. 262, pl. 9, fig. 1. Recent Europe, Greenland. TRYON, 1884, Man. Conch., vol. VI, pl. 30, fig. 93; pl. 27, fig. 22

#### *Propebela tabulata* (Carpenter)

(Pl. 25, figs. 7–11)

*Mangilia tabulata* CARPENTER, 1864b, p. 628, 658; Reprint, 1872, p. 114, 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 29; Reprint, 1872, p. 242; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32

*Daphnella tabulata* (Carpenter), TRYON, 1884, Man. Conch., vol. VI, p. 312, section *Raphitoma*

*Mangilia tabulata* Carpenter, ARNOLD, 1907, Smith. Misc. Coll., vol. 50, pt. 4, pl. LVII, fig. 4 reprinted ARNOLD, 1907, U. S. Geol. Sur., Bull. 321, pl. 11, fig. 4 not typical

? *Turris* (*Bela*) *tabulata* (Carpenter), PACKARD, 1918, Univ. California Pub. Zool., vol. 14, p. 343, pl. 39, fig. 1, not typical

*Lora tabulata* (Carpenter), DALL, 1919, U. S. Nat. Mus., Proc., vol. 56, p. 45, pl. 14, fig. 1; 1921, p. 74; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 78, pl. 18, fig. 5 same as DALL, 1919, pl. 14, fig. 1; OLDROYD, 1927, vol. II, pt. I, p. 101, pl. 7, fig. 13; pl. 18, fig. 5 same as DALL, 1919, pl. 14, fig. 1; GRANT AND GALE, 1931, p. 520 in part; KEEN, 1937, p. 38; BURCH, 1946, no. 62, p. 22 “*Lora*.”



*Propebela tabulata* (Carpenter), SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 183 doubt Monterey record

"Stout, strongly shouldered, coarsely cancellated. Pillar abnormally twisted." [Carpenter, 1864b, p. 658]

Oldroyd (1927) published a copy of Carpenter's description (1865) with a translation. The following lines should be added:

"... , div. 35°

"*Hab.* Neeah Bay; several worn specimens (*Swan*).

"The distinct fold near the base of the pillar may require the formation of a new genus." [Carpenter, 1865a, p. 29]

Ten specimens at the Redpath Museum in the Carpenter collection are labelled "type Neeah Bay Swan." These are on the original Carpenter glass mounts, and the label is the original made by Carpenter. Of the 10 specimens, 5 are figured herein to show how constant or inconstant the characters may be. The specimens are worn, but they reveal the predominant factors of the species. Dall's (1919) figure of the species (same in Oldroyd) is of a shell typical in shape and basic rib character, although the spacing of the spiral ribs of the posterior body whorl belong to an irregular kind. Dall does not explain where the specimen came from.

Besides the syntypes in the Redpath Museum there is also a specimen labelled "type" in the U. S. National Museum. That specimen has been examined by Bartsch and will probably be reported on by him.

The shells figured by Arnold (1907) and Packard are not typical.

*Syntypes*.—Redpath Museum, no. 89, U. S. National Museum, no. 19403

*Distribution*.—Neeah Bay, Washington (type); Sitka, Alaska, to Puget Sound, Washington (Dall in part; Burch in part)

#### Genus *Mitromorpha* Adams in Carpenter, 1865

*Mitromorpha* ADAMS in CARPENTER, 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 182; Reprint, 1872, p. 284; IREDALE, 1917, Malacol. Soc. London, Proc., vol. 12, p. 328, 329. Not *Mitromorpha* ADAMS, 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 322 = *Antimitra* IREDALE, 1917, Malacol. Soc. London, Proc., vol. 12, p. 328, 329

Type species by monotypy, *M. filosa* (Carpenter)<sup>118</sup> CARPENTER, 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 182. Recent. Monterey, California to Gulf of California. (pl. 25, figs. 5, 6)

#### *Mitromorpha aspera* (Carpenter)

(Pl. 25, figs. 3, 4)

? *Daphnella aspera* CARPENTER, 1864b, p. 658; Reprint, 1872, p. 144; 1865, Jour. de Conchyl., vol. XIII, ser. 3, vol. V, p. 146; Reprint, 1872, p. 314; TRYON, 1884, Man. Conch., vol. VI, p. 317, pl. 25, figs. 61, 62 not good

*Mitromorpha aspera* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 32; 1870, Amer. Jour. Conch., vol. VI, p. 66; KEEP, 1887, West Coast Shells, p. 55; COOPER, 1888, 7th Ann. Rept. California State Min., p. 251; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 208, pl. XIX, fig. 3; DALL, 1921, p. 87; OLDROYD, 1927, vol. II, pt. I, p. 174; BAILY, 1935, West Coast Shells (KEEP), p. 263, fig. 281; KEEN, 1937, p. 41; BURCH, 1945, no. 49, p. 33; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 185; ABBOTT, 1954, p. 273, fig. 57 in some figure as WILLIAMSON, 1892

*Manglia* (*Mitromorpha*) *aspera* (Carpenter), GRANT AND GALE, 1931, p. 598

"Elongated with, coarse fenestration.†" [Carpenter, 1864b, p. 658]

† Generic position of all these doubtful; perhaps they belong to genera not yet eliminated: *filosa* resembling the Eocene forms between *Conus* and *Pleurotoma*."

Oldroyd furnished a copy of Carpenter's description (1865) in her monograph (1927). Her copy should be corrected as follows:

<sup>118</sup> The date of *Mitromorpha* in Oldroyd (1927, p. 173) has evidently been transposed in printing. The statement of type species as "*Mitromorpha gracilis* Carpenter" is a confusion following Arnold (1903) who said it was a "characteristic species". The name is a *nomen nudum* in both Arnold (1903, p. 223) and Oldroyd (1927, p. 173). *M. gracilior* Tryon (1884) (Hemphill ms.) was not described until 1884.

Change first word to "? D.t."; line 7, insert "angusta" between "elongata" and "antice;" correct .69 to .09; insert "div. 35°" after "poll."

The following lines should be added to complete her copy:

"Hab. Monterey, *Taylor*.

"Je n'ai vu de cette charmante petite coquille qu'un seul échantillon très-frais, mais incomplètement adulte. Peut-être se trouvera-t-elle mieux placée dans le genre *Mitromorpha*, A. Adams?" [Carpenter, 1865, p. 146]

The holotype of this species is preserved in the U. S. National Museum and not, as stated by Oldroyd and followed by Grant and Gale, in the British Museum.

The holotype bears the label "Type Monterey Taylor," which coincides with the original description. A growth over the apical whorls obscures the characters, but the body whorl is well preserved. The sculpture is not worn, and the microscopic longitudinal striations are clearly seen. At the crossing of the longitudinal and spiral ribs sharp nodes are formed.

*Mitromorpha gracilior* Hemphill in Tryon, 1884, p. 317, pl. 25, fig. 62 was described by Tryon as a "variety" of *M. aspera* (Carpenter). Tryon used a manuscript name of Hemphill and did not indicate a locality for the specimen which he figured. Grant and Gale (1931, p. 597) followed by Smith and Gordon (1948, p. 185) indicated Monterey as the type locality. There is nothing in Tryon to confirm that statement of type locality.

Three specimens in the Redpath Museum (no. 2360) are labelled "*Mitromorpha gracilior* Hemphill type S. Diego." These specimens were the types of the Hemphill manuscript name, but since Tryon is the author of the specific name, the specimen which Tryon figured would be the holotype. Unfortunately it had no published locality. The Redpath Museum specimens have lost their status as syntypes. *M. gracilior* is now regarded as distinct from *M. aspera*; hence the tracing of a type locality in connection with the holotype has not been pursued in this report.

*Holotype*.—U. S. National Museum, no. 22816

*Distribution*.—Recent. Monterey, California (type); Monterey to San Pedro, California (Dall). Pleistocene. Mexico (Jordan, 1926; Grant and Gale)

#### ? "*Daphnella effusa*" Carpenter

? *Daphnella effusa* CARPENTER, 1864, p. 628, 658; Reprint, 1872, p. 114, 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 29; Reprint, 1872, p. 243; TRYON, 1884, Man. Conch., vol. VI, p. 317 genus not questioned; DALL, 1913, Canada Geol. Sur., Victoria Mem. Mus., no. 1, p. 141; 1919, U. S. Nat. Mus., vol. 56, no. 2288, p. 74

*Mitromorpha effusa* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33

". . . † nom. prov. Thin extremely drawn-out, sculpture faint." [Carpenter, 1864b, 658]

"† Generic position of all these [*D. aspera*, *D. filosa*, *D. effusa*] doubtful: perhaps they belong to genera not yet eliminated . . ."

"? *D. testa* gracillima, maxime effusa, rufo-fusca; anfr, angustis elongatus, suturis impressis; striis spiralibus crebris a lineis incrementi decussatis ornata; labro tenuiore, postice vix sinuato. Long. .65, long. spir. .45, lat. .22, div. 30°.

"Hab. Neeah [sic] Bay; one broken specimen (*Swan*)." [Carpenter, 1865a, p. 29]

Tryon gave an English translation of Carpenter's description above. Carpenter's measurements in mm. would be slightly larger than those given by Tryon.

The type has not been found. Dall (1913) apparently had not seen the shell but took his cue from the above description (1865a) that the single broken specimen was unidentifiable.

Keen (*in* Burch, 1946, no. 62, p. 10) suggested that if *Ophiodermella incisa* Carpenter was preoccupied (secondary homonym), [? *Daphnella*] *effusa* Carpenter was available. This would indicate that the two forms were regarded as conspecific.

*Type*.—Not found

*Distribution*.—Neah Bay, Washington (type)

**Mitromorpha filosa** (Carpenter)

(Pl. 25, figs. 5, 6)

? *Daphnella filosa* CARPENTER, 1864b, p. 658; Reprint, 1872, p. 144; TRYON, 1884, Man. Conch., vol. VI, p. 317, pl. 25, fig. 63 poor

*Mitromorpha filosa* CARPENTER, 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 182; Reprint, 1872, p. 284; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; 1870, Amer. Jour. Conch., vol. VI, p. 66; KEEP, 1887, West Coast Shells, p. 55; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, p. 208, pl. XIX, fig. 1; PACE, 1902, Malacol. Soc. London, Proc., vol. 5, p. 83 Columbelloidæ; ARNOLD, 1903, p. 223; DALL, 1921, p. 87; OLDROYD, 1927, p. 173; BAILY, 1935, West Coast Shells (KEEP), p. 264, fig. 282; KEEN, 1937, p. 41; BURCH, 1945, no. 49, p. 33; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 185; ABBOTT, 1954, p. 273, fig. 571 same figure as WILLIAMSON, 1892

*Mangelia* (*Mitromorpha*) *filosa* (Carpenter), GRANT AND GALE, 1931, p. 596

"† Small, diamond-shaped, but rounded periphery; spirally threaded. [Carpenter, 1864b, p. 658]

"† Generic position of all these doubtful; perhaps they belong to genera not yet eliminated: *filosa* resembling the Eocene forms between *Conus* and *Pleurotoma*."

Oldroyd republished the Carpenter's description (1865) in her monograph (1927). The following changes should be made in her copy:

Delete "poll."

Add:

"... div. 45°.

"*Hab.* Sta. Barbara (*Jewett*); Lower California (*teste Trick* [*Frick?*] in Mus. Cuming.).

"= ? *Daphnella filosa*, Brit. Assoc. Rep. 1863, p. 658, note †.

"Mr. A. Adams obtained two similar species from Japan; and as the shells do not rank satisfactorily under any established group, he proposes the above genus for their reception. M. Crosse suggests that *Columbella dormitor*, Sby., may be congeneric." [Carpenter, 1865h, p. 182]

The holotype of this species is in the Redpath Museum at McGill University, on an original Carpenter mount with a Carpenter label, "type Sta. Barbara Jewett." It is dark red, the protoconch has about two smooth whorls, about four of the coarse spiral ribs are on the whorls of the spire, and the columella is smooth.

The statement in Oldroyd and others that the type is in the British Museum is incorrect. Grant and Gale have described well the shell of this species.<sup>119</sup>

*Holotype*.—Redpath Museum, no. 96

*Distribution*.—Recent. Santa Barbara, California (type); Monterey, California, to Gulf of California (Dall). Pleistocene. California (Arnold; Oldroyd, 1925; Grant and Gale); Mexico (Jordan, 1926)

**"Mitromorpha gracilis** Carpenter"

"*Mitromorpha gracilis* Carpenter" in Arnold (1903, p. 223), copied by Oldroyd (1927, vol. II, pt. 1, p. 173) is apparently an error either in spelling or confusion of names. Arnold may have meant *M. gracilior* of Hemphill in Tryon (1884). However, that species was not described until 1884 which was 19 years after the introduction of *Mitromorpha* Adams in Carpenter (1865), with which Arnold associated the specific name as the type species.

## Family Acteonidae

Genus **Acteon** Montfort, 1810( *Tornatella* Lamarek, 1822 )*Tornatella* MONTFORT, 1810, Conchyl. Syst., t. 2, p. 315Type species by original designation, *A. tornatilis* (Gmelin) = *Voluta tornatilis* LINNAEUS, 1767, Syst. Nat., 12th ed., p. 1187; GMELIN, 1791, Syst. Nat., p. 3437. Recent. Western

<sup>119</sup> Their description is not a complete English translation of Carpenter's description (1865), as stated by Burch (1945, no. 49, p. 33). Their description appears to have been based on specimens. The shells which they measured were larger than the figures by Carpenter.

Europe including Mediterranean and Adriatic. Miocene-Pleistocene. Western Europe. PILSBRY, 1893, *Man. Conch.*, vol. XV, p. 152, pl. 19, figs. 7-11, 15; HARMER, 1923, *Palaeont. Soc.*, vol. LXXV, p. 782, pl. LXII, figs. 13, 14  
For discussion of *A. tornatilis* (Linnaeus) see Dodge (1955, p. 58).

#### Subgenus *Rictaxis* Dall, 1871

*Rictaxis*, DALL, 1871, *Amer. Jour. Conch.*, vol. VII, pt. 2, p. 136  
Type species by original designation, *R. punctocaelatus* (Carpenter) [*R. puncto-coelata* sic].  
CARPENTER, 1864, *Suppl. Rept. British Assoc.* 1863, p. 646; *Jour. de Conchyl.*, 1865, vol. XIII, ser. 3, p. 139. Recent. Alaska to Mexico. DALL, 1871, *Amer. Jour. Conch.*, vol. VII, pl. 15, fig. 12

#### *Acteon*<sup>120</sup> (*Rictaxis*) *punctocaelatus* (Carpenter)

- Tornatella punctocaelata* CARPENTER, 1864b, p. 646; Reprint, 1872, p. 132; 1865, *Jour. de Conchyl.*, vol. XIII, ser. 3, vol. V, p. 139; Reprint, 1872, p. 307; COOPER, 1867, *Geog. Cat. Moll.*, *Geol. Sur. California*, p. 13; 1870, *Amer. Jour. Conch.*, vol. VI, p. 56; 1888, 7th Ann. Rept. California State Min. Bur., p. 267  
*Actacon* (*Rictaxis*) *puncto-coelata* (Carpenter) DALL, 1871, *Amer. Jour. Conch.*, vol. VII, p. 136, pl. 15, fig. 12 lectotype; ARNOLD, 1903, p. 189, pl. IX, fig. 6 no hyphen in specific name  
*Rhictaxis punctocoelata* (Carpenter), KEEP, 1887, *West Coast Shells*, p. 125  
*Actacon* (*Rictaxis*) *punctocaelatus* (Carpenter), WILLIAMSON, 1892, *U. S. Nat. Mus., Proc.*, vol. 15, no. 898, p. 195  
*Actacon punctocaelatus* (Carpenter), PILSBRY, 1893, *Man. Conch.*, vol. XV, p. 166, pl. 49, fig. 24 section *Rictaxis*  
*Acteon* (*Rictaxis*) *punctocoelata* (Carpenter), DALL, 1921, p. 60; OLDROYD, 1927, vol. II, pt. I, p. 24, pl. 1, figs. 17, 17a; BAILY, 1935, *West Coast Shells* (KEEP), p. 267, fig. 287  
*Acteon* (*Rictaxis*) *punctocaelatus* (Carpenter), GRANT AND GALE, 1931, p. 443  
*Acteon punctocaelata* (Carpenter), KEEN, 1937, p. 28; SMITH AND GORDON, 1948, *California Acad. Sci., Proc.*, ser. 4, vol. XXVI, p. 179  
*Acteon* (*Rictaxis*) *punctocoelata* (Carpenter), BURCH, 1946, no. 47, p. 9  
*Actaconidea* (*Rictaxis*) *punctato-coelatus* (Carpenter), COSSMANN, 1895, *Essais Paleo. comparée*, I, p. 52, pl. 1, fig. 10  
*Actaconidea* (*Rictaxis*) *punctocoelatus* (Carpenter), COSSMANN, 1903, *Essais Paleo. comparée*, VI, p. 118, pl. IX, figs. 8, 9  
*Actacon punctocoelatus* var. *coronadvensis* STEARNS, 1898, *U. S. Nat. Mus., Proc.*, vol. 21, p. 299; OLDROYD, 1927, vol. II, pt. I, pl. 1, fig. 15. See GRANT AND GALE, 1931, p. 443 and BURCH, 1945, no. 47, p. 10  
*Acteon* (*Rictaxis*) *punctocoelata vancouverensis* OLDROYD, 1927, vol. II, pt. I, p. 25, pl. 1, figs. 19, 20. See GRANT AND GALE, 1931, p. 444 and BURCH, 1945, no. 47, p. 10  
"*Tornatella punctocaelata*, n.s. Small: grooved with rows of dots: pillar twisted as in *Bullina*, Add. non Gray." [Carpenter, 1864b, p. 646]

Oldroyd (1927) published a copy of Carpenter's (1865)<sup>121</sup> description, to which should be added the following:

"Hab. Santa Cruz, Rowell.—San Diego, Cooper.

"Cette espèce est un peu aberrante, à cause de son ouverture large, de son pli reporté près du bord pariétal et de sa columelle tordue comme celle des *Bullina*. La ciselure des tours ressemble aux impressions que laisserait une série de petit colliers." [Carpenter, 1865g, p. 139]

Two syntypes in the U. S. National Museum are labelled, "Fig'd type San Diego Cooper." Dall (1871) did not indicate whether the specimen he figured was a "type" or what the locality or measurements were. Dall's figure is the most likely of all the illustrations of the species to be that of a syntype. The measurements of the syntypes do not fit those given by Carpenter.

<sup>120</sup> *Acteon* is masculine in gender as well as *Rictaxis*. The original spelling is *punctocaelata*.

<sup>121</sup> It would appear from Oldroyd's text that the description she copied was from Carpenter (1864b), the only reference she mentioned (page error). Her republished description is from Carpenter (1865g, p. 139).

There is a large columellar fold on the syntypes. The smaller shell is worn, but the larger specimens show the dark and white bands plainly. The writer chooses the larger of the two individuals to be the lectotype which is probably the one figured by Dall (1871). The writer makes this selection in spite of the discrepancy in measurements, because the two U. S. National Museum shells are the only one which have been found with any indication as to type label. The small shell that Carpenter measured (1865) apparently has been lost, and the two specimens now found are syntypic. If Carpenter handled these syntypes, which correspond in size to the dimensions of the shells which are usually identified as this species, it is strange that he chose such a small shell for representative size (.2 x 25.3 = 5.06 mm. long.; .09 x 25.3 = 2.27 mm. lat.). Carpenter's measurements are puzzling. Grant and Gale (1931, p. 443), as well as Burch (no. 47, p. 9), commented on the relatively large size of the species as identified in contrast to the original dimensions. The choosing of the lectotype presents a more logical measurement basis of identification.

The type locality is San Diego, California. The only possible localities which would qualify as type locality would be, "San Diego," "The Islands" (Farallones), and Santa Cruz (see original description). Smith and Gordon (1948) indicated that Monterey was the type locality. Monterey was not included by Carpenter. Dall had secondary material from Monterey which he listed (1870).

*Dimensions*.—Lectotype: length 10 mm.; greatest diameter 5 mm.; paratype: length 8 mm.; greatest diameter 4 mm.

*Types*.—Lectotype and paratype (former syntypes), U. S. National Museum, no. 14914

*Distribution*.—Recent. San Diego, California (type); southeastern Alaska, to Magdalena Bay, Mexico (Burch). Pleistocene. California (Arnold; Oldroyd, 1925; Grant and Gale; Willett, 1937); Mexico (Jordan, 1926)

#### Family ATYIDAE

#### Genus *Atys* Montfort, 1810<sup>122</sup>

*Atys* MONTFORT, 1810, Conchyliol. syst., vol. 2, p. 342-344

Type species by original designation, *Atys cymbulus* Montfort = *Bulla naucum* LINNAEUS, 1758, Syst. Nat., p. 726. Recent. Indo-Pacific. PILSBRY, 1893, Man. Conch., vol. XV, pl. 28, figs. 11-15

#### Subgenus *Aliculastrum* Pilsbry, 1896

*Aliculastrum* PILSBRY, 1896, Man. Conch., vol. XVI, p. 237 new name for *Alicula* EHRENBERG, 1831, Symbolae Phys. decas. 1st., p. 41 of Mollusca *vide* GARDNER, 1937, not *Alicula* EICHWALD, 1830, Natur. Skizze Lithauen Volhynien Podolien, p. 214. See Neave, 1939-1940

Type species by monotypy, *Bulla cylindrica* HELBLING, 1779, Abhandl. Privat Gesellsch. Böhmen, IV, p. 122, pl. II, figs. 30, 31 *vide* PILSBRY (1893). Recent. Indo-Pacific. PILSBRY, 1893, Man. Conch., vol. XV, pl. 33, figs. 60-64

Because *A. casta* deviates so far from typical *Atys* the writer believes that a better idea of its characters is intimated by its grouping under the subgenus *Aliculastrum*. *B. casta* is more typical of the shell characters of that subgroup than are fossil species in the lower and middle Miocene of Jamaica and Florida, which have been so classified and seem to bear a relationship to *Aliculastrum* (Woodring, 1928, p. 127; Gardner, 1937, p. 269)

#### *Atys (Aliculastrum) casta* (Carpenter)

(Pl. 27, figs. 1-4)

? *Atys castra* CARPENTER, 1864b, p. 618; Reprint, 1872, p. 104; 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 314; Reprint, 1872, p. 212

*Atys casta* (Carpenter), PILSBRY, 1893, Man. Conch., vol. XV, p. 276; DALL, 1921, p. 62; OLDROYD, 1927, vol. II, pt. I, p. 36; ? TOMLIN, 1928, Jour. Conch., vol. XVIII, p. 188; KEEN, 1937, p. 30

*Bulla casta* (Carpenter), BURCH, 1945, no. 47, p. 29

"? *Atys casta*. Rare: allied to *Cylicchna*." [Carpenter, 1864b, p. 618]

<sup>122</sup> *Atys* Montfort would equal *Bulla* Linnaeus, 1758, type species by absolute tautonymy, *B. naucum* Linnaeus (1758) except for the action of Int. Com. Zool. Nomen., 1950. See *Bulla*.

A copy of Carpenter's description (1864) and Pilsbry's translation was published by Oldroyd. To complete Oldroyd's copy the following should be added: "On the confines of the genus, related to *Cylichna*." [Carpenter, 1864a, p. 314]

The type material consists of two specimens in the U. S. National Museum. They are on Carpenter's original glass mount, with label "type. C.S.L." The two specimens, 9 mm. in height, and 2 mm. in height, respectively, possibly represent the young and adult of the same species. The larger specimen is of the approximate dimension given by Carpenter, and the writer therefore selects it as the lectotype. If the smaller specimen is not a juvenile, it is of a different species but of the same genus and subgenus.

The present illustration is the first published of the series. The fine concentric striations which cover the surface, greater anteriorly and posteriorly, do not show in the photograph.

The species was described from Cape San Lucas and is included in this report because a statement of its distribution has been extended by Dall to Catalina Island.

*Types*.—Lectotype: U. S. National Museum, no. 4014 (larger specimen); paratype: same number, smaller specimen

*Distribution*.—Recent. Cape San Lucas, Lower California (type) Catalina Island, California, to Gulf of California (Dall). Pleistocene. California (Willett, 1937)

#### Family RETUSIDAE

#### Genus *Volvulella* Newton, 1901

(*Volvula* Adams, 1850 not Gistel, 1848)

*Volvulella* NEWTON, 1891, Syst. List. Oligocene Eocene Moll. British Mus., p. 268 substitute name for *Volvula* ADAMS in SOWERBY, 1850, Thes. Conch., vol. II, (11), [Cat. Books, Maps, B. M., V, p. 1981], p. 558, 596. Not *Volvula* GISTEL, 1848, Nat. Thierr., VIII. See Neave, 1939-1940

Type species by subsequent designation, BUCQUOY, DAUTZENBERG, AND DOLLFUS, 1886, Moll. Marins du Roussillon, vol. I, pt. 13, p. 533, *Volvula rostrata* A. ADAMS in SOWERBY, p. 596, pl. CXXV, f. 154. Living. Australia. PILSBRY, 1893, Man. Conch., vol. XV, p. 241, pl. 26, fig. 60

The use of *Rhizorus* Montfort (1810, p. 539, monotype *R. Adclaidis* Montfort) for *Volvula* Adams, 1850 (Abbott, 1954, p. 280) is based on the supposition (see Jeffreys, 1867, p. 412; Pilsbry, p. 235) that *R. adclaidis* Montfort (= *Bulla fucicola* Chiereghini (*nomen nudum*) fide Nardo, fide Brusina) indirectly equals *V. acuminata* Bruguière, which is a *Volvula*.

#### *Volvulella cylindrica* (Carpenter)

(Pl. 25, figs. 1, 2)

*Volvula cylindrica* CARPENTER, 1864b, p. 537, 647; Reprint, 1872, p. 23, 133; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 179; Reprint, 1872, p. 281; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 14; 1888, 7th Ann. Rept. California State Min. Bur., p. 270; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 195; PILSBRY, 1893, Man. Conch., vol. XV, p. 239; Arnold, 1903, p. 191, pl. IV, fig. 2

*Volvulella cylindrica* (Carpenter), DALL, 1921, p. 62; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 72; 1927, vol. II, pt. 1, p. 34, pl. 2, fig. 9; GRANT AND GALE, 1931, p. 450; BAILY, 1935, West Coast Shells (Keep), p. 268; WILLETT, 1937, San Diego Soc. Nat. Hist., vol. VIII, no. 30, p. 392; KEEN, 1937, p. 50; BURCH, 1945, no. 47, p. 18-20, 30, pl. II, fig. 17; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXXVI, p. 179

Not *Volvula cylindrica* SMITH, 1871, Zool. Soc. London, Proc., p. 738, pl. LXXV, fig. 29 = *V. smithii* PILSBRY, 1893, Man. Conch., XV, p. 233

Not *Volvula cylindrica* GABB, 1873, Amer. Phil. Soc., Trans., n.s., vol. 15, p. 246 = *V. oxytata* BUSH, 1885, Connecticut Acad. Sci., Trans., vol. VI, pt. 2, p. 468 fide PILSBRY, 1922, p. 312 or = *V. cercadensis* VAN WINKLE [PALMER], 1921, Bull. Amer. Paleont., vol. 8, no. 36, p. 6

"*Volvula cylindrica*, n.s. Like a grain of rice, pointed at one end." [Carpenter, 1864b, p. 647]

Carpenter's description (1865) of this species was republished by Oldroyd (1927, p. 34). Her copy should be corrected to read, "lat. .07" for of ".17". The line "*Hab. Sta. Barbara (Jewett).*" should also be added to complete the copy.

The type of this species is in the Redpath Museum. One specimen has an original label, "*Volvula cylindrica* Sta. Barbara Jewett [in pencil] unique type [in ink]. Monterey Dall [in pencil]." The holotype is worn and has part of a yellowish epidermis remaining. The uneroded surface reveals microscopic spiral lines with wide interspaces. The statement of Oldroyd (copied by others) that the type is in "Mrs. Boyce's collection" means only that the specimen was originally described from "Mrs. Boyce's" (Col. Jewett) material, a collection which is not intact at present.

*Type*.—Redpath Museum, no. 2364

*Distribution*.—Recent. Santa Barbara, California (type); Vancouver Island, British Columbia, to Gulf of California (Dall). Pleistocene. California (Arnold; Grant and Gale; Willett)

#### Genus *Coleophysis* Fischer, 1883

*Coleophysis* FISCHER, 1883, *Man. de Conchyl.*, p. 555

Type species by monotypy, *Utricular truncatulus* (BRUGUIÈRE),<sup>123</sup> 1792, *Enc. Méth.*, Vers, t. 1, p. 377, no. 10 as *Bulla*. Living. Europe. FORBES AND HANLEY, 1851, *Hist. British Moll.*, vol. III, p. 510, pl. CNIV, B, fig. 7, 8, pl. V. V, fig. 4 animal, as *Cylichna truncata* (Adams?) (MONTAGU), 1803

#### *Coleophysis carinata* (Carpenter)

*Tornatina carinata* CARPENTER, 1857, *Cat. Reigen Coll. Mazatlan*, p. 171; 1857, *Rept. Brit. Assoc. Adv. Sci. for 1856*, p. 250, 313; 1860, *Smith. Misc. Coll.*, vol. 2, art. 6, p. 5 Mexican and Panamic Province; 1864b, p. 551, 647; Reprint, 1872, p. 37, 133 bet. San Diego and San Pedro; COOPER, 1867, *Geog. Cat. Moll.*, *Geol. Sur. California*, p. 13; KEEP, 1887, *West Coast Shells*, p. 125; COOPER, 1888, 7th Ann. Rept. California State Min., p. 267 in part; WILLIAMSON, 1892, *U. S. Nat. Mus.*, vol. 15, no. 898, p. 195; PILSBRY, 1893, *Man. Conch.*, vol. XV, p. 187; PALMER, 1951, *New York State Mus.*, Bull. no. 342, p. 30, pl. 1, fig. 1 Carpenter drawing of type

*Acteocina carinata* (Carpenter), DALL, 1921, p. 61; STRONG, 1921, *Nautilus*, vol. 35, no. 2, p. 122; OLDROYD, 1927, vol. II, pt. 1, p. 30; BAKER AND HANNA, 1927, *California Acad. Sci.*, Proc., ser. 4, vol. XVI, no. 5, p. 125; BAILY, 1935, *West Coast Shells* (KEEP), p. 268; KEEN, 1937, p. 28

*Retusa (Acteocina) carinata* (Carpenter), GRANT AND GALE, 1931, p. 449 see for other references; WILLET, 1937, *San Diego Soc. Nat. Hist.*, Trans., vol. VIII, no. 30, p. 392 Pleistocene

*Coleophysis carinata* (Carpenter), BURCH, 1945, no. 47, p. 11, 15

This species was described from Mazatlan, and the illustration of the type belongs in the report on the types of that catalogue (Carpenter, 1857). The type should be in the British Museum.

Oldroyd (1927)<sup>124</sup> republished part of Carpenter's original description with Pilsbry's translation of the Latin.

*Distribution*.—Recent. Mazatlan, West Mexico (type); Redondo Beach, California, to Panama (Burch). Pleistocene. (See Grant and Gale; Willett, 1937.)

#### Family SCAPHANDRIDAE

#### Genus *Acteocina* Gray, 1847

*Acteocina* GRAY, 1847, *Zool. Soc. London, Proc.*, pt. XVI, p. 160

Type species by original designation, *Acteon wetherelli* LEA, 1833, *Cont. Geol.*, p. 213; Miocene. New Jersey. LEA, 1833, pl. 6, fig. 224

<sup>123</sup> There is doubt as to the interpretation of *Bulla truncatulus* Bruguière, 1792. Application for proposal to stabilize the interpretation of the species by reference to *Bulla truncata* Adams (1800) has been made by Lemche, 1957, *Bull. Zool. Nomen.*, vol. 13, no. 4, p. 132.

<sup>124</sup> The following corrections should be made in the Latin copy in Oldroyd: line 3: delete first "a" in "aspira"; line 5: change "m" to "n" in "basim".

*Acteocina inculta* (Gould) in Gould and Carpenter, 1856  
*Acteocina planata* (Carpenter)  
 (Pl. 25, fig. 19)

*Cylichna planata* CARPENTER, 1864b, p. 647; Reprint, 1872, p. 133; 1865, Jour. de Conchyliol., vol. XIII, ser. 3, vol. V, p. 139; Reprint, 1872, p. 307; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 14; PILSBRY, 1893, Man. Conch., vol. XV, p. 302

*Acteocina planata* (Carpenter), DALL, 1921, p. 61; STRONG, 1921, Nautilus, vol. 35, no. 2, p. 45, 123; OLDROYD, 1927, vol. 11, pt. 1, p. 30; KEEN, 1937, p. 28; BURCH, 1945, no. 47, p. 11, 15, 30 pl. II fig. 14

"*Cylichna planata*, n.s. Like *mammillata*, with apex flattened-off, and fold distinct." [Carpenter, 1864b, p. 647]

Carpenter's description (1865) with Pilsbry's translation, is reprinted in Oldroyd's monograph.

The following should be added to make the copy complete:

". . . div. 180°

"*Hab.* San Diego, *Cassidy*." [Carpenter, 1865g, p. 139]

The type of this species is in the Museum of Paleontology, University of California. Burch suggested (1945, p. 15) that the form is the same as *A. inculta* (Gould) (in Gould and Carpenter, 1856). The two species were described from the same locality. Strong (in Burch, 1945, no. 47, p. 11) thought *A. planata* is a senile individual of *A. inculta* (Gould).

*Type*.—Museum of Paleontology, University of California, no. 33501

*Distribution*.—San Diego, California (type)

Genus *Cylichna* Lovén, 1846

(*Bullinella* Newton, 1891)

*Cylichna* LOVÉN, 1846, Index Moll. Lit. Scandinaviae Occ. Hab., p. 10, Ofv. K. Svensk. Vet. Akad. Forh.

Type species by subsequent designation, HERRMANNSEN, 1852, Indicis Gen. Malacozororum, Supplement, p. 42, *Bulla cylindracea* PENNANT, 1777, British Zool., vol. IV, p. 117, pl. 70, fig. 85. Living. Europe. PILSBRY, 1893, Man. Conch., vol. XV, pl. 29, figs. 15-17

*Cylichna attonsa* Carpenter

(Pl. 25, figs. 17, 18)

*Cylichna* (? *cylindracea* var.) *attonsa* CARPENTER, 1864b, p. 537; Reprint, 1872, p. 23; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 58

*Cylichna* (? var.) *attonsa* CARPENTER, 1864b, p. 603, 647, 683; Reprint, 1872, p. 89, 133, 169; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 13; PILSBRY, 1893, Man. Conch., vol. XV, p. 303

*Cylichna propinqua* E. A. SMITH, 1872, Ann. and Mag. Nat. Hist., ser. 4, vol. 9, p. 351 *vide* KEEN in BURCH, 1945, no. 47, p. 24

*Cylichnella* (*Bullinella*) *attonsa* (Carpenter), DALL, 1921, p. 63; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 73; 1927, vol. II, pt. 1, p. 40, pl. 2, fig. 8

*Cylichna attonsa* Carpenter, GRANT AND GALE, 1931, p. 454; WILLET, 1937, San Diego Soc. Nat. Hist., Trans., vol. VIII, no. 30, p. 392; BURCH, 1945, no. 47, p. 23, fig.; p. 24, pl. II, fig. 31; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 179

*Cylichnella attonsa* (Carpenter), KEEN, 1937, p. 34, range corrected in BURCH, 1945, no. 47, p. 24

"*Cylichna* (? var.) *attonsa*. One living sp. Probably a variety of *cylindracea*." [Carpenter, 1864b, p. 603]

"*Cylichna* ? *cylindracea*, Linn. auct. Intermediate specimens passing into *Cylichna* var. *attonsa*, rounded off at apex." [Carpenter, 1864b, p. 647]

Part of Carpenter's notes (1865) was republished by Oldroyd (1927). The following should be added to complete her copy:

"*Hab.*—In sinu Pugetiano specimen unicum legit Kennerley.

"Specimina Californica, à Jewett Cooperque collecta, *C. cylindraceae* typicae magis conveniunt." [Carpenter, 1865e, p. 58]



The figure included by Oldroyd does not seem to have the anterior portion of the outer lip elevated so much as *C. attonsa* does. The discrepancy may be due to the position of the shell in the photograph.

The holotype of this species is in the U. S. National Museum.<sup>125</sup>

The holotype bears the label "Puget Sound Kennerley." This label is verified by the original description. As Keen pointed out Dall's distribution of San Diego, California, should be modified. The type locality is Puget Sound.

There are microscopic wavy spiral lines over the entire surface of the shell. These are not revealed in the photograph of the holotype. The brownish epidermis is lighter in the central area. An elongate light spot is seen in the photograph. This is a glue spot on the shell and not part of the specimen.

*Holotype*.—U. S. National Museum, no. 4495

*Distribution*.—Recent. Puget Sound, Washington (type); Kodiak Island, Alaska, to San Diego, California (Burch). Pleistocene. California (Willett); Oregon (Grant and Gale)

#### Family PYRAMIDELLIDAE

#### Genus *Pyramidella* Lamarck, 1799

*Pyramidella* LAMARCK, 1799, Soc. Hist. Nat. Paris, Mem., p. 76

Type species by monotypy, *Trochus dolabratus* LINNAEUS, 1767, Syst. Nat., 12 ed., p. 1231. Living. Southern Florida and West Indies. TRYON, 1886, Man. Conch., vol. VIII, p. 300, pl. 72, figs. 71-74

#### Genus *Longchaeus* Mörch, 1875

*Longchaeus* MÖRCH, 1875, Malak. Blatt., vol. 22, p. 158

Type species by subsequent designation, *Pyramidella punctata* SCHUBERT AND WAGNER in MARTINI AND CHEMNITZ, 1829, Bd. XII, Abt. 1, p. 152 *vide* SHERBORN, 1929 = *Obeliscus punctatus* (CHEMNITZ) in MÖRCH. Living. Polynesia. BARTSCH, (1955, p. 9) considered *Longchaeus* to be of generic rank distinct from *Pyramidella*.

#### *Longchaeus adamsi* (Carpenter)

*Obeliscus Adamsii* CARPENTER, 1864b, p. 546, 547, 551; Reprint, 1872, p. 33, 37 = *Pyramidella*, sp. ind. C. B. ADAMS, no. 293 (not 294) = Mazatlan Cat. 486, p. 409

*Obeliscus conicus* jun. CARPENTER, 1857, Cat. Mazatlan. Shells, p. 409-10 *vide* DALL AND BARTSCH, 1909

*Obeliscus variegatus* CARPENTER, 1864b, p. 613, 618, 658; Reprint, 1872, p. 99, 104, 144; 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 46; Reprint, 1872, p. 219; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; KEEP, 1887, West Coast Shells, p. 54, fig. 35 not *Pyramidella variegata* A. ADAMS, 1853

*Pyramidella conica* Ads. var. *variegata* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 208 by Dall; ARNOLD, 1903, p. 280?

*Pyramidella (Longchaeus) adamsi* (Carpenter), DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 21, pl. 1, figs. 6, 6a [not type]; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 301, 309; DALL, 1921, p. 120; OLDROYD, 1927, vol. II, pt. II, p. 85; BAILY, 1935, West Coast Shells (KEEP), p. 182, fig. 155; KEEN, 1937, p. 45; BURCH, 1946, no. 61, p. 20, 47; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 192; ABBOTT, 1954, fig. 63a same fig. as DALL AND BARTSCH, 1909 Not *Pyramidella (Synnola) Adamsi* TRYON, 1886, Man. Conch., vol. VIII, p. 306 new name for *Obeliscus aelis* A. Adams (preoccupied)

*Pyramidella conica* C. B. Adams, TRYON, 1886, p. 302 in part

The holotype of this species is from Mazatlan, and the discussion of the species belongs in the report of that area. Since the species is reported from San Pedro to Mazatlan, and one specimen from Monterey, a reference is included herein. The holotype is in the British Museum with the Reigen Mazatlan Collection (tablet 1951). Dall and Bartsch published a drawing of a specimen in the U. S. National Museum. On page 21 they stated that the type was in the British Museum. On page 22 they stated that the illustration was of a

<sup>125</sup> The statement in Oldroyd and Grant and Gale indicating the type depository as the Academy of Natural Sciences at Philadelphia is incorrect.

specimen in the U. S. National Museum. In the explanation of the plate (pl. 1, fig. 6) the specimen is indicated as "type" with the dimensions of the U. S. National Museum specimen. Therefore, the word "type" in the explanation should be deleted. Accordingly, the type data in Oldroyd (1927) should be corrected.

The type of *L. variegata* (Carpenter) came from Cape San Lucas. From the explanation of the use of the name in Arnold, the discussion probably belongs to *L. mexicana* Dall and Bartsch (1909). This interpretation has been followed by Grant and Gale (1931, p. 865). Burch (1946, p. 20) believed that all the forms mentioned represent one species. In that case the species would also have to be accounted for in the diagnosis of the Pleistocene of San Pedro (Arnold).

#### Genus *Odostomia* Fleming, 1813

*Odostomia* FLEMING, 1813,<sup>126</sup> Brewster's Edinburgh Encyclopedia, vol. VII, pt. 1, p. 76  
Type species by subsequent designation, GRAY, 1847, Zool. Soc. London, pt. XV, p. 159,  
*Turbo plicatus* MONTAGU, 1803, Test. Britannica, pt. 2, p. 325. Recent. Europe. TRYON,  
1886, Man. Conch., vol. VIII, pl. 77, fig. 88

#### Subgenus *Besla* Dall and Bartsch, 1904

*Besla* DALL AND BARTSCH, 1904, Biol. Soc. Washington, Proc., vol. XVII, p. 10  
Type species by original designation *Chrysallida convexa* CARPENTER, 1857, Mazatlan  
Cat., p. 424. Living. Mazatlan. DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, pl.  
13, fig. 4

#### *Odostomia* (*Besla*) *callimorpha* Dall and Bartsch

*Chrysallida pumila* CARPENTER, 1864b, p. 613, 659; Reprint, 1872, p. 99, 145; 1866, California  
Acad. Sci., Proc., vol. III, p. 219; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California,  
p. 33; TRYON, 1886, Man. Conch., vol. VIII, p. 311

Not *Odostomia pumila* A. ADAMS, 1861, Ann. Mag. Nat. Hist., ser. 3, vol. VII, p. 298

*Odostomia* (*Besla*) *callimorpha* DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p.  
136, pl. 13, fig. 5 type; new name for *C. pumila* Carpenter; BARTSCH, 1912, U. S. Nat.  
Mus., Proc., vol. 42, no. 1906, p. 304, 327; DALL, 1921, p. 128; OLDROYD, 1927, vol. III,  
pt. II, p. 154; KEEN, 1937, p. 42; BURCH, 1946, no. 61, p. 35

"Like *ovulum*, Maz. Cat. no. 512, but slender; spiral lines delicate." [Carpenter, 1864b,  
p. 659]

"Chr. t. minuta, angusta, alba; vert. nucl. subito inmerso, dimidium truncationis tegente;  
marginibus spirae parum excurvatis; anfr. norm. IV. planatis, suturis vix distinctis;  
clathris radiantibus rectis, validis, planatis, circ. XX., marginibus spirae utroque latere  
parallelis, saepius attingentibus, circa basim elongatam, rotundatam continuis; interstitiis  
lirulis acutis distantibus, haud extantibus, circ. X, decussatis, quarum IV, V, in spira  
monstrantur; apertura ovali, peritremati vix continuo; plica parietem tenus acuta, haud  
celata, declivi.

"Long. 0.06, long. spir. 0.03, lat. 0.25, div. 12°.

"Hab. S. Pedro. Cooper.

"One specimen and a few fragments were found in the shell-washings of Dr. Palmer's  
consignment. Differs from *Chr. ovulum*, in its slender shape and delicate spiral sculpture."  
[Carpenter, 1866a, p. 220]

Dall and Bartsch figured the holotype (Carpenter type, *O. pumila*).

*Dimensions*.—Holotype: Length 1.5 mm.; diameter .6 mm. (Dall and Bartsch)

*Holotype*.—U. S. National Museum, no. 15565

*Distribution*.—San Pedro, California (type); San Pedro, California, to Todos Santos  
Bay (Orcutt; Burch)

#### Subgenus *Chrysallida* Carpenter, 1856

*Chrysallida* CARPENTER, 1856, Zool. Soc. London, Proc., p. 170

Type species by monotypy, "Sp. typ. *Chemnitzia communis*, C. B. Ad., Pan. Shells, no. 223,  
p. 166, 312." Also by first subsequent designation, CARPENTER, 1863, Zool. Soc. London,  
Proc., p. 351; Reprint, 1872, p. 187. *C. communis* C. B. ADAMS, 1852, Ann. Lyc. Nat.  
Hist. New York, vol. 5, 1852, p. 390, p. 166 of separate. Living. Panama. DALL AND  
BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, pl. 14, figs. 10, 10a; MAXWELL SMITH, 1944,  
Panama Shells, fig. 102 copy of DALL AND BARTSCH

<sup>126</sup> Sherborn, 1837, Soc. Bib. Nat. Hist., Jour., vol. 1, pt. 4, p. 112

The monotypic designation of *Chrysallida* can be inferred from Carpenter's statement in his original description, although one other species is linked with the name, because of his definite type designation (1863). His reference is to *C. communis* C. B. Adams. Therefore, the question of the right or wrong identification of *C. communis* in Carpenter (1857a, p. 419) has no bearing on the type species of *Chrysallida* as Dall and Bartsch believed (1909, p. 137; 1955, p. 60). Their statement of the type species of *Chrysallida* as *C. torrita* Dall and Bartsch (= *C. communis* Carpenter, 1857, not C. B. Adams, 1852) has no validity. *Chrysallida* was proposed in the year before the Mazatlan Catalogue was published (1857). Carpenter stated earlier (1856) that more details would be given in the Mazatlan Catalogue.

#### *Odostomia (Chrysallida) cincta* Carpenter

*Chrysallida cincta* CARPENTER, 1864b, p. 613, 659; Reprint, 1872, p. 99, 145; 1866, California Acad. Sci., Proc., vol. III, p. 220; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33

*Pyramidella cincta* (Carpenter), TRYON, 1886, Man. Conch., vol. VIII, p. 315, pl. 74, fig. 51, section *Mumiola*

*Mumiola cincta* (Carpenter), KEEP, 1887, West Coast Shells, p. 54

*Odostomia (Chrysallida) cincta* (Carpenter), DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 137, 152, pl. 15, figs. 2, 2a type; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 304, 329; DALL, 1921, p. 128; OLDROYD, 1927, vol. II, pt. III, p. 156, pl. 58, figs. 2, 2a type same as DALL AND BARTSCH, 1909; BAILY, 1935, West Coast Shells (KEEP), p. 184; KEEN, 1937, p. 42; BURCH, 1946, no. 61, p. 8, 36

"Passing towards *Mumiola*. Radiating sculpture very faint. [Carpenter, 1864, p. 659]

"Chr. t. satis regulari, alba, marginibus spirae vix excurvatis; vert. nucl. parvo, celato, didimium truncationis vix superante; anfr., norm. IV parum excurvatis, suturis distinctis; costis spiralibus obtusis circ. X, cincta, quarum IV, in spira monstrantur; costis iii posticis radiatim subgranulosis, seriebus circ. XV., marginibus spirae utrinque parallelis, supra quartam subobsoletis; interstitiis latis, delicatim decussatis; basi satis prolongata; columella antice valde effusa; plicae parva, mediana.

"Long. 0.11, long. spir. 0.07, lat. 0.05, div. 35°.

"Hab. Santa Barbara group of islands, Cooper.

"The solitary specimen is probably immature. Intermediate between *Chrysallida* proper and *Mumiola*." [Carpenter, 1866a, p. 220]

Apparently Dall and Bartsch and Oldroyd overlooked Carpenter's detailed description (1866). The type is in the U. S. National Museum. It is labeled "Sta. Barbara Cooper fig'd type".

Dall and Bartsch included an enlarged description. This was recopied by Oldroyd.

*Dimensions*.—Length 3 mm.; diameter 1.5 mm. (holotype) (Dall and Bartsch)

*Holotype*.—U. S. National Museum, no. 15730

*Distribution*.—Santa Barbara Island, California (type); Santa Barbara to San Diego, California (Burch)

#### *Odostomia (Chrysallida) virginalis* Dall and Bartsch

*Evalea gracilente* "Cpr", KEEP, 1887, West Coast Shells, p. 52

*Odostomia (Chrysallida) virginalis* DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 160, pl. 18, figs. 7, 7a. Not *Odostomia gracilenta* MONTEROSATO, 1878, Gior. Sci. Nat. Ec., vol. XIII, p. 93 var. of *interstincta* MONTAGU. The writer cannot find *O. gracilenta* in Monterosato, 1884, "12," mentioned as *fide* Tryon, Man. Conch., vol. VIII, 1886, p. 384

Keep apparently used a manuscript name of Carpenter and therefore should receive credit for the specific name. Dall and Bartsch in transferring the specific name to *Odostomia* discovered that there was a previous *O. gracilente*. As a secondary homonym Keep's designation required renaming. Dall and Bartsch's appellation was given to replace a formerly described species; hence the type of their name should be that of Keep. In this case Dall and Bartsch chose a new type from a distant locality (Todos Santos Bay, Lower California). Presumably Keep's specimens came from California. He probably did not segregate certain specimens, and they have not been found. However, for scientific purposes and technicalities of nomenclature it would be better if a neotype had been chosen for the new name, *O. virginalis*, from the California area instead of from Lower California.

Subgenus *Evalea* A. Adams, 1860

*Evalea* ADAMS, 1860, Ann. Mag. Nat. Hist., ser. 3. vol. VI, p. 22

Type species by subsequent designation, VERRILL AND BUSH, 1900, Connecticut Acad. Arts Sci., Trans., vol. X, pt. II, p. 533, *Evalea elegans* A. Adams. Living. Japan

*Odostomia (Evalea) inflata* Carpenter

*Odostomia inflata* CARPENTER, 1864b, p. 628, 658; Reprint, 1872, p. 114, 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 395 in part; Reprint, 1872, p. 285; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; 1870, Amer. Jour. Conch., vol. VI, p. 66; TRYON, 1886, Man. Conch., vol. VIII, p. 358 in part not pl. 78, fig. 45; KEEP, 1887, West Coast Shells, p. 53; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15 no. 898, p. 209

*Odostomia (Evalea) inflata* CARPENTER, in part, DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, no. 1574, p. 524, pl. XLVII, fig. 8 lectotype; DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 201, pl. 23, fig. 7 lectotype same as 1907 fig.; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 306, 337; DALL, 1921, p. 133 correct "Dall and Bartsch" as author; OLDROYD, 1927, vol. II, pt. II, p. 195, pl. 63, fig. 7 lectotype; pl. 66, fig. lectotype same as DALL AND BARTSCH, 1907, 1909; BAILY, 1935, West Coast Shells (KEEP), p. 184; KEEN, 1937, p. 42; BURCH, 1946, no. 61, p. 13, 42; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 194

"Like large *dolioliformis*: with most minute spiral striulation, Farallone Is. on *Hal. rufescens*, teste Darbshire." [Carpenter, 1864, p. 658]

In the recording of this description the species was listed from Vancouver region.

"O. testa majore, tenui, pallide cinera epider-mide cinera induta; vert. nucl. subito immerso; anfr. norm. IV, rapidissime aurentibus, subplanatis, suturis impressis; tota superficie minutissime et confertissime spiralliter striolata; umbilico nullo; basi et apertura valde elongatis; labro acuto; labio tenuissimo; plica acuta, transversa, parietem attingente; columella valde arcuata, antice effusa. Long. .26, long. spir. .09, lat. .14, div. 60°.

"Variat spira elatiore. Long. .24, long. spir. .11, lat. .13, div. 45°.

"Variat quoque striolis subobsoletis

"Hab. Sta. Barbara (Jewett); Farraleone Islands, in cavities, on *Haliotis* (teste R. D. Darbshire); near San Francisco (Rowell); Neah Bay (Swan)." [Carpenter, 1865h, p. 395. Includes *O. inflata* Carpenter and *O. jewetti* Dall and Bartsch, 1909]

The original description of *O. inflata* Carpenter (1864b, p. 658) is meager but sufficient to claim validity. In that description only the Vancouver region and the Farallones material are included.

When Carpenter wrote his final description of what he called *O. inflata* (1865, p. 395) he included specimens from Santa Barbara, collected by Jewett, as well as other California localities, and the original material from Neah Bay, Washington, sent in by Swan.

Dall and Bartsch regarded the description as covering two distinct species, and in 1907 they described the Jewett forms as a new species, *O. jewetti*. They figured the original specimens, which they called types, of each suite. Each specimen is a lectotype. The illustrations reveal that the specimens do represent distinct forms. Confusion has entered into the differentiation of *O. inflata* Carpenter and *O. jewetti* Dall and Bartsch, because those authors were not complete in their references. In 1921 (p. 133) there is an error in printing in Dall's list, crediting *O. inflata* to Dall and Bartsch. Part authorship of Dall and Bartsch is carried over into Oldroyd (1927, p. 195). Carpenter is the author of *O. inflata*, and Dall and Bartsch of *O. jewetti*.

*Dimensions*.—Length 6.2 mm.; diameter 3.8 mm (lectotype, Dall and Bartsch)

*Lectotype*.—U. S. National Museum, no. 15521b (Also includes one paratype, second of the original syntypes)

*Distribution*.—Neah Bay, Washington (type); Raspberry Island, Alaska, to Monterey, California (Burch)

*Odostomia (Evalea) jewetti* Dall and Bartsch

*Odostomia inflata* CARPENTER, 1864b, p. 537; Reprint, 1872, p. 23; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 395 in part; Reprint, 1872, p. 285

*Odostomia (Evalea) jewetti* DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, no. 1574, p. 523, pl. XLVII, fig. 3 lectotype; 1909, U. S. Nat. Mus., Bull. 68, p. 201, pl. 23, fig. 3 lectotype same fig. as 1907; BARTSCH, 1912, U. S. Nat. Mus., Proc. vol. 42,

no. 1906, p. 306, 337; DALL, 1921, p. 133; OLDROYD, 1927, vol. III, pt. II, p. 196, pl. 66, fig. 3; pl. 63, fig. 3 lectotype same fig. as DALL AND BARTSCH, 1907, 1909; KEEN, 1937, p. 42; BURCH, 1946, no. 61, p. 42

For a discussion of the name see *O. inflata* Carpenter. For description and illustration of the species see Dall and Bartsch (1907; 1909; repeated in Oldroyd, 1927).

*Dimensions*.—Length 6.1 mm., diameter 3.3 mm. (lectotype, Dall and Bartsch)

*Lectotype*.—U. S. National Museum, no. 15521c (also includes one paratype, second of the original syntypes)

*Distribution*.—Santa Barbara, California (type)

*Odostomia (Evalea) tenuis* Carpenter

*Odostomia tenuis* Carpenter was described by Carpenter (1857a, p. 412). Dall and Bartsch (1909, pl. 22, fig. 3) figured a Carpenter drawing of the type in the British Museum (Natural History).

The *O. tenuis* "Carpenter" of Dall and Bartsch in Arnold (1903, p. 281, pl. 1, fig. 14) is not the *O. tenuis* Carpenter (1857). Dall and Bartsch described that shell as *O. (Evalea)* (1909, p. 199, pl. 22, fig. 4). The holotype is from Santa Rosa Island, California.

*O. tenuis* Carpenter (1857a) is also not the *O. tenuis* Dall (1897, p. 14) as *Mumiola tenuis*). That species was renamed *O. pharcida* by Dall and Bartsch (1907).

*Odostomia (Evalea) tenuisculpta* Carpenter

(Pl. 21, figs. 9, 10)

*Odostomia tenuisculpta* CARPENTER, 1864b, p. 628, 659; Reprint, 1872, p. 114, 145; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 30; Reprint, 1872, p. 244; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; TRYON, 1886, Man. Conch., vol. VIII, p. 359, p. 78, fig. 49 var. *incisa*

*Odostomia straminea* CARPENTER, 1865, Jour. de Conchyliol., vol. XIII, p. 146; Reprint, 1872, p. 314; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; *vide* DALL AND BARTSCH, 1907, p. 527; 1909, p. 206; BURCH, 1946, no. 61, p. 44

*Odostomia (Evalea) tenuisculpta* (Carpenter), DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, p. 527, pl. XLVII, fig. 6; 1909, U. S. Nat. Mus., Bull. 68, p. 206, pl. 23, fig. 2 same figure as 1907 ?type; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 306, 338; DALL, 1921, p. 134; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 127. 1927, vol. II, pt. II, p. 207, pl. 63, fig. 2 same as DALL AND BARTSCH, 1909; pl. 66, fig. 6 same as Dall and Bartsch, 1907; BAILY, 1935, West Coast Shells (KEEP), p. 185; KEEN, 1937, p. 43; BURCH, 1946, no. 61, p. 13, 14, 15, 44; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 194

"Like *sublirulata*, Maz. Cat. no. 487, with obsolete sculpture throughout." [Carpenter 1864b, p. 659]

Oldroyd (1927) republished Carpenter's description (1865). The following changes should be made in her copy:

Delete "poll."

Add: ". . . div. 60°.

"*Hab.* Neeah Bay; one specimen (*Swan*)."  
[Carpenter, 1865a, p. 30]

Dall and Bartsch presented a detailed description of the species (1907) and repeated it later (1909). In regard to the measurement and category of the specimen figured there is a discrepancy. In the text (1907, p. 527) the specimen figured was said to be one of two specimens from the type locality by the original collector but not the holotype. Its length was given as 5.3 mm. which coincides with that in the explanation of the plate (pl. XLVII, fig. 6). However, the same drawing is included later (1909, pl. 23, fig. 2), but in the explanation of the plate it is listed as type with the length 2.3 mm., which is the length of the holotype (p. 206). Examining the holotype one finds that the drawing of Dall and Bartsch is of the holotype which is no. 15520. It is smaller than another specimen (no. 46483 of Dall and Bartsch, p. 206) which is segregated. Dall and Bartsch, therefore, figured the holotype (1907; 1909, explanation pl. 23, fig. 2, 1909 is correct). A photograph of the holotype is included herein (pl. 21, figs. 9, 10).

Dall and Bartsch determined *O. straminea* Carpenter (described from Cape San Lucas) as a southern smooth form of this species.

*Holotype*.—U. S. National Museum no. 15520. (Same number is catalogued also for *O. satura* Carpenter)

*Distribution*.—Neah Bay, Washington (Swan) (type); Barkley Sound, Vancouver Island, British Columbia, to Lower California (Dall)

Subgenus *Menestho* Möller, 1842

*Menestho* MÖLLER, 1847, Index Moll. Groenlandiae, p. 10 in Naturhist. Tidsskr., 4 (1), 1842, p. 83

Type species by monotypy, *Turbo albulus* FABRICIUS, 1780, Fauna Groenlandica, p. 394. Living. Greenland

*Odostomia* (*Menestho*) *aequisculpta* (Carpenter)

*Odostomia* (*Evalea*) *aequisculpta* CARPENTER, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 46, 47; Reprint, 1872, p. 219

*Odostomia* (*Oscilla*) *aequisculpta* (Carpenter), DALL AND BARTSCH in ARNOLD, 1903, p. 284, pl. I, figs. 3, 3a type

*Odostomia* (*Menestho*) *aequisculpta* (Carpenter), DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 191, pl. 20, figs. 3, 3a type; JORDAN, 1924, So. California Acad. Sci., Bull., vol. 23, pt. 5, p. 145-146; GRANT AND GALE, 1931, p. 874; KEEN, 1937, p. 42; BURCH, 1946, no. 61, p. 47

This species was described from Cape San Lucas. The type was figured by Dall and Bartsch (in Arnold) and in their later monograph (1909). Although Arnold indicated that the species was living from Cape San Lucas north to San Pedro, such distribution apparently was not verified. Arnold also included the species in the Pleistocene of San Diego. Jordan (1924) stated that the northern range extended to San Diego. On Jordan's authority, Keen and Burch include the species in the southern California fauna. The discussion and synonymy are not intended to be complete in this report.

Subgenus *Amaura*<sup>127</sup> Möller, 1842

*Amaura* MÖLLER, 1842, Index Moll. Groenlandiae in Naturh. Tidsskr., vol. 4, (1), p. 80  
Type species by monotypy, *Amaura candida* MÖLLER, 1842. Living. Greenland

*Odostomia* (*Amaura*) *avellana* Carpenter

*Odostomia* [*nuciformis*] ? var. *avellana* CARPENTER, 1864b, p. 658; Reprint, 1872, p. 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 30; Reprint, 1872, p. 243; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; TRYON, 1886, Man. Conch., vol. VIII, p. 359 list only

*Odostomia* (*Amaura*) *nuciformis avellana* (Carpenter), ARNOLD, 1903, p. 283, pl. I, fig. II DALL AND BARTSCH; DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, p. 530, pl. XLVIII, fig. 1, 1a type

*Odostomia* (*Amaura*) *avellana* (Carpenter), DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 4, 5, 218, 225, 228, pl. 28, fig. 3; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906 p. 307-342; DALL, 1921, p. 136; OLDRÖYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 132; 1927, vol. II, pt. II, p. 212, pl. 64, fig. 3 same as DALL AND BARTSCH, 1907 and 1909; GRANT AND GALE, 1931, p. 876, cf. pl. 32, fig. 20; KEEN, 1937, p. 42; BURCH, 1946, no. 61, p. 11, 45

"Shape of *conoidalis*." [Carpenter, 1864b, p. 658]

"O. testa *O. nuciformis* indole simili, sed spira valde prolongata.

"Long. .32, long. spir. .16, lat. .16, div. 50°.

"Hab. Neeah Bay; one specimen (Swan).

"Like a gigantic form of *O. conoidalis*." [Carpenter, 1865a, p. 29]

Dall and Bartsch discussed the species in detail and figured the holotype of the species.

*Dimensions*—Length 8.3 mm.; diameter 4.3 mm. (holotype) (Dall and Bartsch)

*Holotype*.—U. S. National Museum, no. 15517b

<sup>127</sup> Preoccupied by *Amaura* Geyer (in Huebner, 1837, p. 39, for reference see Neave, 1939-40). There is a disagreement as to whether *Amaura candida* belongs in the Naticidae (Fischer, 1887 [1885]; Tryon, 1883) or Euspiridae (Cossmann, 1925) or Pyramidellidae (Dall and Bartsch, 1909; Theile, 1931)

*Distribution*.—Recent. Neah Bay, Washington (type); Neah Bay, Washington, to San Martin Island, Lower California (Burch). Pleistocene. California (Arnold; Grant and Gale)

***Odostomia (Amaura) gouldii* Carpenter**

*Odostomia [satura] var. Gouldii* CARPENTER, 1864b, p. 658; Reprint, 1872, p. 144; 1865, Ann. Mag. Nat. Hist. ser. 3, vol. XV, p. 30; Reprint, 1872, p. 243; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; TRYON, 1886, Man. Conch., vol. VIII, p. 358

*Odostomia Gouldii* Carpenter, KEEP, 1887, West Coast Shells, p. 53 probably var. *O. inflata* Carpenter

Not *Odostomia (Ezalea) gouldii* (Carpenter), ARNOLD, 1903, p. 282, pl. I, fig. 15 *vide* DALL AND BARTSCH, 1907, p. 528

*Odostomia (Amaura) gouldii* (Carpenter), DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc. vol. 33, p. 531, pl. XLVIII, fig. 4 type; DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 4, 5, 204, 218, 224, pl. 27, fig. 2 type; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 307, 342; DALL, 1921, p. 136; OLDROYD, 1924, Pub. Puget Sound Biol. Sta., vol. 4, p. 132; GRANT AND GALE, 1931, p. 876, BAILY, 1935, West Coast Shells (KEEP), p. 185; KEEN, 1937, p. 42; BURCH, 1946, no. 61, p. 11, 45

"Taller, base gently rounded." [Carpenter, 1864b, p. 658]

"O. testa solida, alba, ovoidea, marginibus spirae valde excurvatis; vert. nucl. decliviter immerso; anfr. norm. v., subplanatis, suturis valde impressis; periphæria haud angulata; basi excurvata, haud tumida; apertura ovata, postice parum constricta; labro solido; labio conspicuo, rimam umbilicalem formante; plica submediano, solida, extante, haud declivi. Long. .23, long. spir. .13, lat. .1, div. 30°.

"Hab. Neeah Bay; very rare (*Swan*).

"Agrees in some respects better with the diagnosis of *O. grævida*, Gould, than do Col. Jewett's shells, from which it is presumed the species was described. These large forms appear very variable." [Carpenter, 1865a, p. 29]

Dall and Bartsch (1907; repeated 1909) discussed the species in detail and figured the holotype.

*Dimensions*.—Holotype: Length 6.1 mm., diameter 3.1 mm. (Dall and Bartsch)

*Holotype*.—U. S. National Museum, no. 22821

*Distribution*.—Neah Bay, Washington (type); Neah Bay, Washington south to San Diego, California (Burch)

***Odostomia (Amaura) nuciformis* Carpenter**

*Odostomia nuciformis* CARPENTER, 1864b, p. 628, 658; Reprint, 1872, p. 114, 144; 1865, Ann. Mag. Nat. Hist. ser. 3, vol. XV, p. 30; Reprint, 1872, p. 243; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; KEEP, 1887, West Coast Shells, p. 53; WILLIAMSON, 1892, U. S. Nat. Mus., vol. XV, no. 898, p. 209

*Odostomia muciformis [sic]* Carpenter, TRYON, 1886, Man. Conch., vol. VIII, p. 358, pl. 78, fig. 46

*Odostomia (Amaura) nuciformis* (Carpenter), DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, p. 530, pl. XLVIII, figs. 3, 3a type; 1909, U. S. Nat. Mus., Bull. 68, p. 4, 5, 219, 227, pl. 28 fig. 1, type same fig. as 1907; Bartsch, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 307, 343; DALL, 1921, p. 137; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 133; 1927, vol. II, pt. II, p. 220, pl. 64, fig. 1 same as DALL AND BARTSCH; BAILY, 1935, West Coast Shells (KEEP), p. 185; KEEN, 1937, p. 43; BURCH, 1946, no. 61, p. 11, 46

"Very large, solid Tornatelloid." [Carpenter, 1864b, p. 658]

A copy of Carpenter's description (1865) was published by Oldroyd (1927). The following changes should be included in her copy:

Line 2: read "vertice" for "vertie;," last line: delete "poll."

Add:

". . . div. 70°

"Hab. Neeah Bay; extremely rare (*Swan*)." [Carpenter, 1865a, p. 30]

Dall and Bartsch (1907; 1909) furnished a detailed description of the species and illustrated the holotype.

*Dimensions*.—Holotype: length 7.7 mm.; diameter 4.4 mm. (Dall and Bartsch)

*Holotype*.—U. S. National Museum, no. 15517a

*Distribution*.—Neah Bay, Washington (type); Neah Bay, Washington, to San Diego, California (Burch)

***Odostomia (Amaura) satura* Carpenter**

*Odostomia satura* CARPENTER, 1864b, p. 628, 658; Reprint, 1872, p. 114, 144; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 29; Reprint, 1872, p. 243; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; KEEP, 1887, West Coast Shells, p. 54, ? fig. 34; TRYON, 1886, Man. Conch., vol. VIII, p. 358, pl. 78, fig. 48

*Odostomia (Amaura) satura* (Carpenter), DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, p. 529, pl. XLVIII, figs. 5, 5a type; 1909, U. S. Nat. Mus., Bull. 68, p. 45, 218, 221, pl. 27, fig. 1 same as 1907 type; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 307, 342; DALL, 1921, p. 136; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 131; 1927, vol. II, pt. II, p. 222; GRANT AND GALE, 1931, p. 876; BAILY, 1935, West Coast Shells (KEEP), p. 185, fig. 161, type same fig. as DALL AND BARTSCH, 1907; 1909; KEEN, 1937, p. 43; BURCH, 1946, no. 61, p. 11, 46

*Odostomia satura pupiformis* CARPENTER, 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 30; Reprint, 1872, p. 243; TRYON, 1886, Man. Conch., vol. VIII, p. 358; DALL AND BARTSCH in ARNOLD, 1903, p. 283, pl. 1, fig. 13, type, as *O. (Amaura) pupiformis*; 1907, U. S. Nat. Mus., Proc., vol. 33, p. 529, 530, 1909, U. S. Nat. Mus., Proc., vol. 68, p. 221 under *O. satura*; Grant and Gale, 1931, p. 876, under *O. satura*

"Large, with swollen whirls [sic] like *Bithinia similis*." [Carpenter, 1864b, p. 658]

A copy of Carpenter's description (1865) was republished by Oldroyd (1927). The following should be changed in her copy:

Delete "poll."

Add:

"... div. 40°

"Hab. Neeah Bay; rare (*Swan*)

"Var. *pupiformis*: anfr. primis valde depressis, planatis; vertice mammillato; anfr. ult. normali. Specimen unicum, quasi monstruosum. Long. .19, long. spir. .1, lat. .12, div. 45°." [Carpenter, 1865a, p. 30]

Dall and Bartsch (1907; repeated 1909) presented a detailed description of the species. They included, with good reason, the "var." *pupiformis* Carpenter as an injured individual of the species. They figured the type of *O. pupiformis* in Arnold (1903) and the type of *O. satura* (1907; 1909).

The same U. S. Nat. Museum catalogue number applies to both *O. satura* and *O. tenuisculpta*. *O. satura* is labelled, "Neah Bay type Swan."

*Dimensions*.—Length 6.4 mm.; diameter 3.5 mm. (holotype) (Dall and Bartsch)

*Holotype*.—U. S. National Museum, no. 15520 (holotype, *O. pupiformis*, no. 15520a)

*Distribution*.—Recent. Neah Bay, Washington (type). Pleistocene. California (Dall and Bartsch in Arnold; Grant and Gale)

***Odostomia (Ivara) terricula* Dall and Bartsch**

*Odostomia (Ivara) terricula* [turricula] Dall and Bartsch (1909, p. 179) was described by Dall and Bartsch in Arnold (1903, p. 285). The name was a manuscript one of Carpenter, and it was misspelled as *terracula*. Dall and Bartsch (1909) pointed out the typographical error, so the writer assumes that the corrected form might be authenticated. However, Dall (1921, p. 130) apparently decided that the original misspelling should stand for the specific name he so wrote it. Dall was followed by Oldroyd (1927, p. 173), Burch (1946, no. 61, p. 39), and Abbott (1954, p. 290). Keen (1937, p. 43) and Smith and Gordon (1948, p. 194) used "*turricula*." Such a dual usage is not a healthy condition in the taxonomy of the species, for error of interpretation and listing of two different species could easily creep into records. The most practical and least involved method of solving the problem is to return to the original spelling of the specific name. This has published sanction of one of the original authors. An original author, of course, has no more right to change his published name than any other author. However, in this case it does give an authoritative opinion.

***Odostomia (Iolea) eucosmia* Dall and Bartsch**

*Oscilla insculpta* "Cpr.," KEEP, 1887, West Coast Shells, p. 52

*Odostomia (Iolea) eucosmia* DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68 p. 183,



pl. 20, figs. 10, 10a. New name for *O. insculpta* Keep. Not *Odostomia insculpta* DE KAY, 1843, Zool. New York, pt. V, Mollusca, p. 115

Keep used a manuscript name of Carpenter, so that Carpenter cannot be credited with the name.

The above is a new name for that of Keep which was preoccupied when the species was transferred to *Odostomia*. Dall and Bartsch used specimens other than those of Keep for the type of their new name. They chose a specimen from Lower California. Again, as in the case of *O. virginialis*, a neotypic choice from the type area of Keep (California) would be more appropriate than from Lower California.

The type of *Oscilla insculpta* Carpenter ms. is in the Redpath Museum, no. 2371. The Carpenter type was discovered by the author in 1951. There are two specimens with the label, "Oscilla insculpta San Diego H H type." Because Carpenter's name is a *nomen nudum* and Keep's is preoccupied the species is now known by Dall and Bartsch's appellation. The Carpenter type has no value. Therefore, no figure of it is included in this report.

#### Genus *Turbonilla* Leach in Risso, 1826

*Turbonilla* RISSO, 1826, Hist. Nat. Europe Merid., vol. 4, p. 224

Type species by subsequent designation, HERRMANNSEN, 1852, Ind. Gen. Malac., Supp. et Corr., p. 136, *T. costulata*<sup>128</sup> RISSO, 1826, Fossil. Saint Jean. RISSO, 1826, fig. 72

The type designation of Gray (1847, p. 160) of *Turbo elegantissima* Montagu (1803, pt. II, p. 298) is valid only if that species is proven to be equivalent to *T. costulata* Risso. *T. elegantissima* Montagu is restricted to a northern distribution by modern workers (Winckworth, 1932, p. 227; Palmer, 1947, p. 228).

#### Subgenus *Chemnitzia* d'Orbigny, 1840

*Chemnitzia* d'ORBIGNY, 1840,<sup>129</sup> in WEBB AND BERTHELOT'S Hist. Nat. Iles Canaries, p. 77 as subgenus of *Melania*

Type species by monotypy *Chemnitzia campanellae* (PHILIPPI), 1836, Enum. Moll. Sicil., vol. I, p. 156, t. 9, fig. 5 as *Melania*; Recent. Sicily. TRYON, 1886, Man. Conch., vol. VIII, pl. 75, fig. 77

#### *Turbonilla* (*Chemnitzia*) *muricata* (Carpenter)

*Chemnitzia muricata* CARPENTER, 1857, Cat. Mazatlan Shells, p. 428

*Turbonilla* (*Strioturbonilla*) *muricata* Carpenter, DALL AND BARTSCH in ARNOLD, 1903, p. 270

*Turbonilla* (*Chemnitzia*) *muricata* Carpenter, DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 36, pl. 2, fig. 9; GRANT AND GALE, 1931, p. 866

The species was described from Mazatlan by Carpenter and has not been reported in the Recent fauna from the area of the scope of this report. Dall and Bartsch figured the type (1909). The notes herein are not intended to be complete. Arnold stated that the species occurred in the Pleistocene, "rare" in the lower Pleistocene (lower San Pedro) of San Pedro and Deadman Island, and common in the upper Pleistocene (upper San Pedro = Palos Verdes sand) of San Pedro and Los Cerritos, California. This distribution has been repeated by Grant and Gale.

#### Subgenus *Bartschella* Iredale, 1916

(*Dunkeria* Dall and Bartsch, 1909; not Carpenter, 1857)

*Bartschella* IREDALE, 1916, Malacol. Soc. London, Proc., vol. 12, p. 36

Type species by original designation, *Dunkeria subangulata* CARPENTER, 1857, Mazatlan Cat., p. 434. Recent. Mazatlan. DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, pl. 12, fig. 11 type

<sup>128</sup> Not *T. costulata* Verrill, 1873, Rep. U. S. Comm. Fish., pt. 1, p. 658 = *T. mighelsi* Bartsch, 1909, Boston Soc. Nat. Hist., Proc., vol. 34, p. 88.

<sup>129</sup> See Stearns (1937, p. 54) for dates of publication of Webb and Berthelot.

**Turbonilla (Bartschella) laminata** (Carpenter)

*Dunkeria laminata* CARPENTER, 1864b, p. 537, 659; Reprint, 1872, p. 23, 145; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 396; Reprint, 1872, p. 286; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; KEEP, 1887, West Coast Shells, p. 52

*Turbonilla laminata* (Carpenter), TRYON, 1866, Man. Conch., vol. VIII, p. 338, pl. 76, fig. 51

*Turbonilla (Pyrgiscula) laminata* (Carpenter), ARNOLD, 1903, p. 277, pl. II, figs. 8, 8a DALL AND BARTSCH

*Turbonilla (Dunkeria) laminata* (Carpenter) DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 120, 121, 122, pl. 12, figs. 16, 16a; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 303, 326

*Turbonilla (Bartschella) laminata* (Carpenter), DALL, 1921, p. 127; OLDROYD, 1927, vol. II, pt. II, p. 150; GRANT AND GALE, 1931, p. 872; BAILY, 1935, West Coast Shells (KEEP), p. 183, fig. 158 same as DALL AND BARTSCH; KEEN, 1937, p. 48; BURCH, 1946, no. 61, p. 34; ABBOTT, 1954, fig. 631 same fig. as DALL AND BARTSCH, 1909

"Subgenus of *Chemnitzia*, with rounded whorls: typical species. Aspect of *Fenella*, finely cancellated." [Carpenter, 1864, p. 659]

Oldroyd (1927) republished a copy of Carpenter's description (1865). The following should be changed in her copy:

Delete "poll", last line.

Add:

". . . div. 20°.

"Hab. Sta. Barbara (*Jewett*); San Diego (*Cooper*).

"This beautiful Fenelloid species may be regarded as the type of the group *Dunkeria*." [Carpenter, 1865h, p. 396]

Dall and Bartsch presented a detailed description of the species and figured a specimen collected by Cooper at San Pedro, California, not the type locality.

*Dimensions*.—Length 6.6 mm.; diameter 2.1 mm. (Dall and Bartsch, specimen figured)

*Type*.—Not found

*Distribution*.—Recent. Santa Barbara or San Diego, California (type); Redondo Beach, California, to South Coronado Islands (Burch). Pleistocene. California (Arnold; Oldroyd, 1924; Willett, 1937); Mexico (Jordan, 1926)

Subgenus **Pyrgiscus** Philippi, 1841

*Pyrgiscus* PHILIPPI, Archiv. Naturgesch., 7, Bd. 1, p. 50

Type species by subsequent designation, DALL AND BARTSCH in ARNOLD, 1903, California Acad. Sci., Mem., vol. III, p. 274; *Melania rufa* PHILIPPI, 1836, Enum. Moll. Sicil., vol. 1, p. 156, pl. IX, fig. 7. Living. Europe. TRYON, 1886, Man. Conch., vol. VIII, pl. 74, figs. 68-70

**Turbonilla (Pyrgiscus) castanea** (Keep)

*Chemnitzia castanea* "Cpr.", KEEP, 1887, West Coast Shells, p. 52, fig. 33

Not *Turbonilla (Pyrgiscus) castanea* DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., 33, no. 1574, p. 509, pl. XLVII, fig. 7 = *T. castanella* DALL, 1908, Nautilus, vol. 21, no. 10, p. 131

*Turbonilla (Pyrgiscus) castanea* (Keep), DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 101, pl. 9, figs. 1, 1a not type; BARTSCH, 1912, U. S. Nat. Mus., vol. 42, no. 1906, p. 303, 322

Keep apparently used a manuscript name of Carpenter for this species. But, as Dall and Bartsch have shown, Keep only is responsible for the name. Dall and Bartsch described and illustrated a specimen from San Pedro collected by Oldroyd. This is not the type, as they indicated in the explanation of the plate (pl. 9, figs. 1, 1a). They explained that Keep's type which they had examined came from San Diego. Bartsch (1912, p. 322) recorded the Keep type in the U. S. National Museum.

Curiously Dall and Bartsch (1907) described a *Turbonilla (Pyrgiscus) castanea*. Therefore, when Keep's species was transferred to the category of *Turbonilla*, Dall and Bartsch's name became preoccupied. Dall consequently renamed their specific name, *T. castanella*.

*Turbonilla (Pyrgiscus) tenuicula* (Gould)*Chemnitzia crebrifilata* Carpenter

(Pl. 21, fig. 20)

- Chemnitzia tenuicula* GOULD, 1853, Boston Soc. Nat. Hist., Jour., vol. 6, p. 383-384, pl. 14, fig. 15; DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 92, pl. 8, figs. 3, 7, 7a, 12, 12a, 14, 14a (type of *T. cuspidata* Carpenter) including representative figures of Carpenter name; GRANT AND GALE, 1931, p. 870, see for additional synonymy
- Chemnitzia terebralis* CARPENTER, 1857, Mazatlan Shells, p. 432 *vide* DALL AND BARTSCH, 1909, p. 92
- Chemnitzia unifasciata* CARPENTER, 1857, Mazatlan Shells, p. 433 *vide* DALL AND BARTSCH, 1909, p. 92
- Chemnitzia* (? *tenuicula*, var.) *subcuspidata* CARPENTER, 1864b, p. 613, 659; Reprint, 1872, p. 99, 145 *vide* DALL AND BARTSCH, 1909; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33
- Chemnitzia subcuspidata* CARPENTER, 1866, California Acad. Sci., Proc. vol. III, p. 220
- Chemnitzia crebrifilata* CARPENTER, 1864b, p. 537, 659; Reprint, 1872, p. 23, 145; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 395; Reprint, 1872, p. 285; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33
- Turbonilla (Pyrgiscus) crebrifilata* (Carpenter), DALL AND BARTSCH *in* ARNOLD, 1903, p. 276, pl. II, figs. 6, 6a *vide* DALL AND BARTSCH, 1909
- Turbonilla (Pyrgiscus) subcuspidata* (Carpenter), DALL AND BARTSCH *in* ARNOLD, 1903, p. 277, pl. II, figs. 2, 2a type *vide* DALL AND BARTSCH, 1909; BURCH, 1946, no. 61, p. 32 under *T. (P.) tenuicula* Gould

Dall and Bartsch indicated in the synonymy of *T. tenuicula* Gould several Carpenter names. *T. terebralis* and *T. unifasciata* are Mazatlan catalogue names, and the figuring of the types of those forms properly belong with the illustration of that catalogue. The holotype of *T. crebrifilata* (Santa Barbara) is in the Redpath Museum, no. 2363. That of *T. tenuicula subcuspidata* Carpenter is in the U. S. National Museum (no. 14829) and was figured by Dall and Bartsch (1903, Pl. II, figs. 2, 2a; 1909, pl. 8, figs. 14, 14a).<sup>130</sup> It is a specimen collected by Cooper at San Diego. (See Carpenter, 1864b, p. 613, no. 106.)

"Ribs more distant, muricated at sutures." [Carpenter, 1864, p. 659 *C. tenuicula* var. *subcuspidata*]

"Slender, whitish; with 8 spiral threads passing over 24 ribs, evanescent round base." [Carpenter, 1864b, p. 659, *C. crebrifilata*]

"C. testa satis tereti, subalbida, haud regulari; anfr. nucl. ii., helicoideis, decliviter sitis, margines spirae parum excurvatis paullum superantibus; norm. VIII, quorum primi subrotundati, ultimi vix planati, suturis valde distinctis; cost. rad. circ. XXIV., subrectis, acutioribus, angustis, interdum attingentibus, anfr. ultimo crebrioribus minus expressis, circa basim prolongatam haud subito evanescentibus; lirulis spiralibus, in spira circ. VIII., rotundatis expressis, anfr. ult. supra costas subnodulosis, circa basim crebrioribus; peritremate continuo; columella vix torta, haud plicata; labio distincto. Long. .22, long. spir. .17, lat. .07, div. 18°.

"*Hab.* Sta. Barbara, 1 specimen (*Jewett*)." [Carpenter, 1865h, p. 395, *C. crebrifilata*]

"... State Collection, no. 670; a.

"Ch. t. parva, minus tereti, cerina seu purpureo-fusca; anfr. nucl. ii. et. dimidio, valde decliviter sitis, marginibus spirae parum excurvatis superantibus; norm. viii. planatis, suturis excavatis; costis radiantibus circ. xviii. acutis, circa basim prolongatam vix continuis, ad suturas valde elevatis, subcuspidatis; interstitiis latioribus undulatis; sulcis spiralibus creberrimis, altis, in spira circ. x., costas vix secantibus, circa basim impressis; peritremati vix continuo, labio distincto; columella vix torta.

"Long. 0.23, long. spir. 0.16, lat. 0.06, div. 25°.

"*Hab.* S. Diego; 25 dredged in shoal water. *Cooper*.

"Differs from the figure of *Ch. tenuicula* (which represents a shell with more numerous ribs than the diagnosis) in its more distant ribs with broader interstices; closer and deeper spiral sculpture; impressed sutures; and especially by the elegant murication of the tops of the ribs, with projecting curved lines between. This is best seen in the young shells, when the ribs are distinct over the base." [Carpenter, 1866, p. 220, *C. subcuspidata*]

<sup>130</sup> Substitute Carpenter for Gould in author's name (1909, explanation pl. 8, fig. 14). The same figure is in Arnold (1903, Pl. II, figs. 2, 2a labelled type); also indicated type in Dall and Bartsch (1909, p. 93) and Bartsch (1912, p. 321).

Arnold reported the Carpenter forms *T. crebrifilata* (San Diego) and *T. subcuspidata* from the Pleistocene of San Pedro and San Diego regions.

*Turbonilla* (*Pyrgiscus*) *virgo* (Carpenter)

*Chemnitzia virgo* CARPENTER, 1864b, p. 537, 659; Reprint, 1872, p. 23, 145; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 396; Reprint, 1872, p. 286; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34

*Turbonilla virgo* Carpenter, TRYON, 1886, Man. Conch., vol. VIII, p. 333 list only

*Turbonilla* (*Pyrgiscus*) *virgo* (Carpenter), DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 75, 78, 93, 94, pl. 8, figs. 4, 4a (type ?); BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 303, 321; DALL, 1921, p. 126; OLDROYD, 1927, vol. II, pt. II, p. 136; KEEN, 1937, p. 49; BURCH, 1946, no. 61, p. 7, 33

"Very slender, with short, smooth base; 18 ribs, evanescent at periphery, and 8 spiral grooves." [Carpenter, 1864b, p. 659]

Oldroyd (1927) republished Carpenter's description (1865). The following should be changed in her copy:

Line 2: For "VII" read "VIII;" last line: delete "poll."

Add:

". . . div. 12°.

"Hab. Sta. Barbara, 1 specimen (*Jewett*)." [Carpenter, 1865h, p. 396]

The specimen in the U. S. National Museum, no. 73993, is labelled, "Sta. Barbara Stearns Coll. fig'd type unique". The label in the bottle containing the specimen is "unique type", in Carpenter's handwriting. Hence the specimen is the "holotype". However, Carpenter has a discrepancy in his choosing of the type. His description referred to Jewett as the collector. The writer, therefore, prefers to use the term lectotype in designating the lone type representative of the species.

There is a slight and unimportant disagreement between the measurement of length in the text in Dall and Bartsch (1909, p. 94) and that stated in the explanation of the plate.

The species has been described in detail by Dall and Bartsch and the lectotype figured.

*Lectotype*.—U. S. National Museum, no. 73993

*Distribution*.—Santa Barbara, California (type)

Subgenus *Pyrgolampros* Sacco, 1892

(*Pyrgolamprus* Cossmann, 1921)

*Pyrgolampros* SACCO, 1892, I Moll. de Piemonte edella Liguria, Reale Accad. Sci. Torino, Mem. (2), 42, p. 667

Type species by original designation, *P. mioepiplicatulus* SACCO, 1892, p. 669, pl. II, fig. 91. Tortonian, Middle Miocene. Italy

*Turbonilla* (*Pyrgolampros*) *aurantia* (Carpenter)

*Chemnitzia aurantia* CARPENTER, 1864b, p. 537, 603, 659 (? var.); Reprint, 1872, p. 23, 89, 145; COOPER, 1870, Amer. Jour. Conch., vol. VI, p. 66; SMITH AND GORDON, 1948, p. 102 query Monterey record

*Chemnitzia chocolata* var. *aurantia* Carpenter, COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33 in part

*Chemnitzia tridentata* (? var.) *aurantia* Carpenter, 1865, Jour. de Conchyliol., vol. XIII, ser. 3, vol. V, p. 147; Reprint, 1872, p. 315

*Turbonilla* (*Lancea*) *aurantia* (Carpenter), DALL AND BARTSCH in ARNOLD, 1903, p. 272

*Turbonilla aurantia* (Carpenter), TRYON, 1886, Man. Conch., vol. VIII, p. 333 list only; not WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 209

*Turbonilla* (*Pyrgolampros*) *aurantia* (Carpenter), DALL AND BARTSCH, 1907, U. S. Nat. Mus., vol. 33, p. 502, pl. XLV, fig. 5 [lectotype]; DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 60, 66 (duplicate of 1907), pl. 6, fig. 4 same as 1907; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 302, 317; DALL, 1921, p. 123; OLDROYD, 1927, vol. II, pt. II, p. 123, pl. 52, fig. 4 [lectotype]; pl. 54, fig. 5 type, both same as DALL AND BARTSCH, 1907; 1909; GRANT AND GALE, 1931, p. 869; KEEN, 1937, p. 48; BURCH, 1946, no. 61, p. 5, 27; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 192 queried Monterey record.

"Intermediate between the above: orange, base round; 26 ribs, striulate between." [Carpenter, 1864b, p. 659]

Oldroyd (1927) republished a copy of Carpenter's description (1865) of this species. To that copy the following lines should be added:

". . . div. 20°.

"*Hab.* Santa Barbara, Jewett.—Puget Sound, Kennerley.

"Il est possible qu'on reconnaisse plus tard que cette espèce est le jeune âge du *Ch. tridentata*: elle est intermédiaire entre elle et le *Ch. chocolata*." [Carpenter, 1865g, p. 148]

Dall and Bartsch (1907) gave and repeated (1909) a complete discussion of the shell of this species and figured the lectotype. The specimen (no. 4493b) is labelled "Puget Sound" and "Santa Barbara." Dall and Bartsch suggested that the specimen came from Puget Sound, as the species has not been reported south of there since Carpenter's and Cooper's time. Because of the discrepancy in the label, the writer uses the term lectotype and follows Dall and Bartsch in choosing Puget Sound as the proper locality. Dall and Bartsch referred (1907; 1909) to the specimen mentioned as "type," but it is listed by Bartsch (1912) as specimen.

There is still uncertainty, however, regarding this species, because Carpenter (1864b, p. 531, 603, 659; 1865g, p. 148) made particular mention that the species was found by Col. Jewett at Santa Barbara.

*Dimensions*.—Lectotype: length 5.8 mm.; diameter 2.4 mm. (Dall and Bartsch). [Expl. pl. XLV, 1907, length 6.2 mm. corrected elsewhere]

*Lectotype*.—U. S. National Museum, no. 4493b

*Distribution*.—Recent. Puget Sound, Washington (type); Departure Bay, Victoria, British Columbia and Puget Sound (Dall). Pleistocene. California (Arnold; Grant and Gale)

#### **Turbonilla (Pyrgolampros) chocolata (Carpenter)**

*Chemnitzia chocolata* CARPENTER, 1864b, p. 613, 659; Reprint, 1872, p. 99, 145; 1866, California Acad. Sci., Proc., vol. III, p. 220; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; 1870, Amer. Jour. Conch., vol. VI, p. 66

*Turbonilla chocolata* Carpenter, TRYON, 1887, Man. Conch., vol. VIII, p. 333 list only; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 209

*Turbonilla (Pyrgolampros) chocolata* (Carpenter), DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 60, 70, pl. 5, figs. 9, 9a; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1907, p. 302, 317; DALL, 1921, p. 124; OLDROYD, 1927, vol. II, pt. II, p. 115, pl. 50, figs. 9, 9a same as DALL AND BARTSCH; KEEN, 1937, p. 48; BURCH, 1946, no. 61, p. 4, 27; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 193; ABBOTT, 1954, fig. 63e same fig. as DALL AND BARTSCH, 1909

*Turbonilla (Pyrgolampros) berryi* DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, no. 1574, p. 500, pl. 44, figs. 10, 10a; DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 69, pl. 6, figs. 5, 5a *vide* SMITH *in* BURCH, p. 27; SMITH AND GORDON, 1948, p. 193

*Turbonilla (Pyrgolampros) painei* DALL AND BARTSCH, 1909, p. 71, pl. 5, figs. 4, 4a *vide* SMITH AND GORDON, 1948, p. 193

"Same size and colour: not toothed: base prolonged: crowded ribs minutely striulate between." [Carpenter, 1864b, p. 659]

Carpenter's description (1866) was republished by Oldroyd (1927). The following should be changed in her copy:

Delete "poll."

Add:

". . . State Collection, no. 428"

". . . div 17°.

"*Hab.* S. Pedro, S. Diego, Monterey; rare. *Cooper*."

"One specimen, in Dr. Palmer's consignment, is known from *Ch. tridentata* by the very effuse spire, prolonged base, and crowded ribs without waved sculpture between." [Carpenter, 1866a, p. 220]

Dall and Bartsch described the species in detail and illustrated a specimen collected by Cooper from San Pedro that could well be chosen as a lectotype (no. 15315, U. S. National Museum).

*Dimensions*.—Length 14 mm.; diameter 3.6 mm (specimen figured by Dall and Bartsch)  
*Holotype*.—Not found

*Distribution*.—Recent. San Pedro, San Diego, or Monterey, California (type): Monterey to Catalina Island, California (Burch). Pleistocene. San Diego (Cooper, 1888)

#### **Turbonilla (Pyrgolampros) valdezi** Dall and Bartsch

*Turbonilla (Pyrgolampros) gibbosa* "Carpenter" DALL AND BARTSCH, 1903, in ARNOLD, p. 279, pl. 1, figs. 2, 2a = *T. valdezi* DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, no. 1574, p. 502, pl. 44, figs. 3, 3a same figure as in ARNOLD, 1903 = *T. valdezi* DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 62, pl. 6 fig. 8 same figure as in ARNOLD (1903) and DALL AND BARTSCH (1907). Not *Turbonilla gibbosa* CARPENTER, 1857, Mazatlan Cat., p. 430 as *Chemnitzia*

Subgenus **Mormula** A. Adams, 1864<sup>131</sup>

*Mormula* A. ADAMS, 1864, Jour. of Proc. Linn. Soc. London, Zool., vol. 7, p. 1

Type species by subsequent designation, VERRILL AND BUSH, 1909, Connecticut Acad. Arts. Sci., Trans., X, pt. II, p. 531; *Mormula rissoina* A. ADAMS, 1864. Living. Japan

#### **Turbonilla (Mormula) tridentata** (Carpenter)

(Pl. 21, fig. 19)

*Chemnitzia tridentata* CARPENTER, 1864b, p. 537, 603, 659; Reprint, 1872, p. 23, 89, 145; 1865, Jour. de Conchyl., vol. XIII, ser. 3, vol. V, p. 147; Reprint, 1872, p. 315; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 33; 1870, Amer. Jour. Conch., vol. VI, p. 66

*Turbonilla tridentata* (Carpenter), TRYON, 1886, Man. Conch., vol. VIII, p. 333 list only

*Turbonilla (Lancea) tridentata* (Carpenter), ARNOLD, 1903, p. 273, pl. II, figs. 1, 1a identification made by Dall and Bartsch

*Turbonilla (Mormula) tridentata* (Carpenter), DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, no. 1574, p. 511, pl. XLV, fig. 9; 1909, U. S. Nat. Mus., Bull. 68, p. 114, pl. 11, figs. 12, 12a; Bartsch, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 303, 324; DALL, 1921, p. 127, OLDROYD, 1927, vol. II, pt. II, p. 147, pl. 56, figs. 12, 12a same as DALL AND BARTSCH, 1909; pl. 54, fig. 9 same as DALL AND BARTSCH, 1907; GRANT AND GALE, 1931, p. 871; KEEN, 1937, p. 49; BURCH, 1946, no. 61, p. 8, 34; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XVI, p. 193; ABBOTT, 1954, fig. 63f same fig. as DALL AND BARTSCH, 1909

"Large, chestnut: 19–24 ribs, evanescent at periphery: waved interspaces with 8–10 spiral grooves: labrum with 3 teeth, hidden as in *Obeliscus*: base round." [Carpenter, 1864b, p. 659]

A copy of Carpenter's description (1865) was republished by Oldroyd (1927). The following should be changed in her copy:

Line 2, read "pallidioribus" for "pall dioribus;" line 3, read "11" for "ii"; line 5, read "undatis" for "undates;" line 7, read "labro" for "labio;" line 8, read ".45" for ".43."

Add:

". . . div. 16°.

"Hab. Santa Barbara, *Jewett*.—Puget Sound, *Kennerley*.—Monterey, San Pedro, *Cooper*.

"Les trois dents de cette belle espèce, cachées tout à fait à l'intérieur de l'ouverture, comme dans plusieurs espèces du genre *Obeliscus*, ont été, pour la première fois, observées sur un individu cassé et roulé de Santa Barbara. Celui-ci a 22 côtes; celui de Monterey, 20; celui du nord, 19; et ceux de San Diego, 24." [Carpenter, 1865g, p. 147]

The type of this species is labelled "Type Monterey, Cal." It is, therefore, the third specimen mentioned by Carpenter and collected by Cooper.

Dall and Bartsch gave a complete description of the species and illustrated a shell from San Pedro. The holotype is figured herein.

*Lectotype*.—U. S. National Museum, no. 15315b

<sup>131</sup> Neave (1940, p. 219) gave the date as 1863. The volume examined is dated 1864.

*Distribution*.—Recent. Monterey, California (type); Monterey to San Diego, California (Dall). Pleistocene. California (Arnold; Grant and Gale; Willett, 1937)

Subgenus **Strioturbonilla** Sacco, 1892

*Strioturbonilla* Sacco, 1892, I Moll. terr. terz. del Piemonte Liguria, pt. XI, Torino, p. 94; 1892, Boll. Mus. Zool. Anat. comp., Torino, vol. VII, no. 121, p. 55

Type species by original designation, *S. sigmoidea* (Jeffreys) = *Odostomia sigmoidea* JEFFREYS, 1884, Zool. Soc. London, Proc., p. 354. Recent. Algiers, Palermo; 163½ fathoms. JEFFREYS, 1884, pl. XXVI, fig. 9

Dall and Bartsch (1904; 1909) stated that the type of *Strioturbonilla* Sacco is *T. alpina* Sacco. They have been followed by such students as Cossmann (1921, p. 281) and Thiele (1929). Sacco designated as type *S. sigmoidea* (Jeffreys) in both his descriptions (1892).

**Turbonilla (Strioturbonilla) styliana** (Carpenter)

(Pl. 22, fig. 16)

*Chemnitzia torquata* ? var. *styliana* CARPENTER, 1864b p. 537, 659; Reprint, 1872, p. 23, 145; 1865, Ann. Mag. Nat. Hist., ser. 3, vol. XV, p. 396; Reprint, 1872, p. 286; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 34; 1870, Amer. Jour. Conch., vol. VI, p. 66

*Turbonilla torquata styliana* (Carpenter), TRYON, 1886, Man. Conch., vol. VIII, p. 333, pl. 76, fig. 32; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. XV, no. 898, p. 209

*Turbonilla (Strioturbonilla) styliana* (Carpenter), DALL AND BARTSCH, 1907, U. S. Nat. Mus., Proc., vol. 33, no. 1574, p. 497, pl. XLIV, figs. 11, 11a; DALL AND BARTSCH, 1909, U. S. Nat. Mus., Bull. 68, p. 41, 48, 53, pl. 3, figs. 7, 7a type?; BARTSCH, 1912, U. S. Nat. Mus., Proc., vol. 42, no. 1906, p. 302, 313; DALL, 1921, p. 122; OLDROYD, 1927, vol. II, pt. II, p. 100; GRANT AND GALE, 1931, p. 867; KEEN, 1937, p. 49; BURCH, 1946, no. 61, p. 3, 26

*Turbonilla (Strioturbonilla) torquata styliana* DALL AND BARTSCH in Arnold, 1903, p. 272 in part *vide* DALL AND BARTSCH, 1909, pl. 1, figs. 10, 10a

*Turbonilla (Turbonilla) styliana* (Carpenter), SMITH AND GORDON, 1948, California Acad. Sci., Proc. ser. 4, vol. XXVI, no. 8, p. 192

"Like *torquata*, tapering less swollen in front, with more ribs, band less marked." [Carpenter, 1864b, p. 659]

Oldroyd (1927) republished Carpenter's (1865) description. The following should be changed in her copy:

Line 4: for "fascis" read "fascia;" last line; for "8" read ".8;" delete "poll."

Add:

"... div. 10"

"Hab. Sta. Barbara (*Jewett*); Monterey (*Cooper*)."

 [Carpenter, 1865b, p. 396]

There is a discrepancy as to the category of the illustration of this species in Dall and Bartsch.

The explanation in the text and of the illustration in regard to the specimen figured by Dall and Bartsch (1907) stipulated that the specimen was collected by Dall at Monterey and did not indicate that the shell was the holotype. Under the circumstances it could not be the holotype. The type was either collected by Jewett or Cooper. Dall and Bartsch later (1909) duplicated the text and figures of the discussion of this species, except that, in the explanation of Figure 11 of the plate, "type" is inserted. The specimen in the U. S. National Museum, no. 14829 is indicated as type. This is the specimen catalogued by Carpenter in the U. S. National Museum catalogue. It is labelled "*Chemnitzia* (? *torquata* var. *styliana*) type Monterey Cooper." Another specimen in the Redpath Museum is labelled by Carpenter, "*Chemn.* ? var. *styliana* type St. Barbara." The two syntypes, therefore, of the original description are accounted for, because each was collected at a different locality, the writer designates no. 14829 U. S. National Museum as the lectotype.

Dall and Bartsch discussed the species thoroughly.

*Lectotype*.—U. S. National Museum, no. 14829; paratype, Redpath Museum, no. 5729

*Distribution*.—Recent. Monterey, California (type). Monterey, California, to Coronado Islands, California (Dall). Pleistocene. California (Cooper, 1888; Arnold; Grant and Gale; Oldroyd, 1937); Mexico (Jordan, 1926)

## Family SIPHONARIIDAE

Genus *Siphonaria* Sowerby, 1823

*Siphonaria* J. DE C. SOWERBY, 1823,<sup>132</sup> Genera Recent and Fossil Shells [not dated], pt. XXI  
Type species by subsequent designation, GRAY, 1847, Zool. Soc. London, Proc., p. 181,  
*S. siphonaria* SOWERBY, 1823. Recent. Philippincs. SOWERBY, 1823, fig. 1

Subgenus *Liriola* Dall, 1870

*Liriola* DALL, 1870, Amer. Jour. Conch., vol. VI, p. 32 as section; DALL, 1878, Jour. de  
Conchyl., vol. XXVI, p. 69

Type species by original designation, *Siphonaria thersites* CARPENTER, 1864, Ann. Mag. Nat.  
Hist., ser. 3, vol. XIV, p. 425. Recent. Aleutian Islands to Strait of Juan de Fuca. DALL,  
1870, Amer. Jour. Conch., vol. VI, pl. 4, fig. 8a, 8b; pl. 5, fig. 2; 1925, U. S. Nat. Mus.,  
Proc., vol. 66, pl. 33, figs. 2, 3; HUBENDICK, 1946, Kungl. Sv. Vet. Akademiens, Hand-  
lingar, ser. 3, Bd. 23, no. 5, pl. 5, figs. 35-38

*Siphonaria (Liriola) thersites* Carpenter

*Siphonaria thersites* CARPENTER, 1864b, p. 561, 627, 647, 676, 684; Reprint, 1872, p. 47, 113,  
133, 162, 170; 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIV, p. 425; Reprint, 1872,  
p. 237 *S. Thersites*; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 21; Dall,  
1870, Amer. Jour. Conch., vol. VI, pl. 33, 39, pl. 4, fig. 8; pl. 5, fig. 2, *Liriola* section;  
1921, p. 66; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 75; DALL, 1925,  
U. S. Nat. Mus., Proc., vol. 66, no. 2554, p. 26, pl. 33, figs. 2, 3 subgenus *Liriola*; OLDROYD,  
1927, vol. II, pt. 1, p. 57; KEEN, 1931, p. 46; BURCH, 1945, no. 48, p. 15; HUBENDICK,  
1946, Kungl. Sv. Vet. Akademiens, Handlingar, ser. 3, Bd. 23, no. 5, p. 19, pl. 5, figs.  
35-38

"*Siphonaria Thersites*, n.s. Rare, dead. Like *tristensis* and other Cape Horn and N. Zea-  
land types. The genus was not known north of Margarita Bay." [Carpenter, 1864b, p. 627]

"*Siphonaria Thersites*, n.s. Like *lateralis*: with strong lung-rib and obsolete sculpture."  
[Carpenter, 1864, p. 647]

Oldroyd (1927) republished Carpenter's description (1864). To make that copy complete  
the following should be added:

"*Hab.* Neeah Bay (*Swan*).

"This genus, which culminates in western tropical American and at Cape Horn, is not  
known in California. The Vancouver species resembles *S. lateralis* and its congeners, but  
differs in having an enormous lung-rib and no colour-rays." [Carpenter, 1864b, p. 426]

The holotype of this species has not been found. The statement of Oldroyd that the type  
is in the U. S. National Museum is incorrect. Dall (1870) did not figure Carpenter's type,  
but a specimen (U. S. National Museum, no. 60412) collected by him from Sitka, Alaska.  
This specimen does not qualify as lectotype because the type locality is Neah Bay. The speci-  
men figured by Dall (1925) from Alaska (U. S. National Museum no. 55802) does not  
qualify for lectotype.

So far, as Hubendick points out, this species is the only northern cold-water species in  
the Siphonariidae. It can be readily distinguished from other members of the family pro-  
vided the general locality of the specimens are known. Hubendick (1946) described the  
shell and anatomy.

*Type*.—Not found

*Distribution*.—Neah Bay, Washington (type); Aleutian Islands, to Strait of Juan de  
Fuca, Washington (and British Columbia) (Dall)

Genus *Williamia* Monterosato, 1884

*Williamia* MONTEROSATO, 1884, Nomen. Gen. e Spec. di Alcune Conch. Medit., p. 150

Type species by monotypy *Ancylus ? gussonii* O. G. COSTA, 1829, Oss. Is. Pantelleria e  
Catal., p. CXX, CXXV, p. 10, n.21; 1829, Cat. test. Sicilie. Recent. Mediterranean.  
Canary Islands; Madeira; Cape Verde Islands. HUBENDICK, 1946, Kungl. Sv. Vet.  
Akademiens, Handlingar, ser. 3, Bd. 23, no. 5, pl. 6, figs. 34, 35, 37

<sup>132</sup> Sykes (1907, p. 194) gave Dec. 31, 1823. Newton (1891, p. 322) gave 1825. Neave  
(1940, Q-Z, p. 204) accepted 1823. Hubendick (1946) used January, 1824.



*Williamia peltoides* (Carpenter)

(Pl. 25, fig. 15, 16)

*Nacella peltoides* CARPENTER, 1864b, p. 545, 618; Reprint, 1872, p. 31, 104; CARPENTER, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 474; Reprint, 1872, p. 213

*Nacella subspiralis* CARPENTER, 1864. See synonymy and discussion following.

*Siphonaria peltoides* (Carpenter), DALL, 1870, Amer. Jour. Conch., vol. VI, p. 37 not pl. 4, 11a, b = *W. vernalis* (DALL), 1870 p. 37 in part

*Liriola peltoides* (Carpenter), DALL, 1878, Jour. de Conchyl., vol. XXVI, p. 70 in part

*Siphonaria* (*Williamia*) *peltoides* (Carpenter), WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 196

*Williamia peltoides* (Carpenter), DALL, 1907, Nautilus, vol. 21, no. 8, p. 86; 1921, p. 67, pl. 15, figs. 10, 12 not type as stated by Dall; OLDROYD, 1927, vol. II, pt. II, p. 58, pl. 2, fig. 17 copy of DALL, 1921, pl. 12; GRANT AND GALE, 1931, p. 463; BAILY, 1935, West Coast Shells (KEEP), p. 277; KEEN, 1937, p. 50; SMITH, MAXWELL, 1944, Panama Marine Shells, p. 44; BURCH, 1945, no. 48, p. 16; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 182; HUBENDICK, 1946, Kungl. Sv. Vet. Akademiens, Handlingar, ser. 3, Bd. 23, no. 5, p. 72

"262. [of Mazatlan Catalogue] = *Nacella peltoides*, n.s. (described from Capt St. Lucas specimens)." [Carpenter, 1864b, p. 545] "15. 474. [A.N.H. vol. XIII, Sp. Page.] *Nacella peltoides* = *Nacella*, sp. indet., Maz. Cat., no. 262." [Carpenter, 1864b, p. 618]

Oldroyd (1927) republished Carpenter's description (1864a). The following line should be added to make that copy complete:

"= *Nacella*, sp. ind., Maz. Cat. no. 262, p. 202."

Oldroyd, followed by Grant and Gale, stated that the type was in the Liverpool Museum which would mean that the shell (no. 262) of the Mazatlan Catalogue was considered the type.

Carpenter was explicit in his first notes (1864b, p. 545) that the species was "described from Cape St. Lucas specimens."

The syntypes consist of two specimens in the U. S. National Museum, mounted on an original Carpenter glass mount and labelled in Carpenter's handwriting, "Cape St. Lucas Xantus M. Cat. 262," and two specimens in the Redpath Museum marked "type Cape San Lucas."

The two specimens in the U. S. National Museum measure: length 4 mm.; 1.5 mm.; greatest diameter 3 mm.; 1 + mm., respectively. The Redpath Museum specimens measure: 4 mm. by 3.5 mm. by 2 mm.; 3 + mm. by 2.5 mm. by ? respectively.

Regardless of a note with the Carpenter types, "fig'd by Dall," one cannot believe that those were the shells which Dall illustrated. Certainly the shell that he figured (1921, pl. 15, figs. 10, 12), which in the explanation of the plate (p. 216) is labelled as "type", cannot be such a specimen. Dall's measurements of "long. 10 mm., alt. 6.5 mm." are nearly three times the typical measurements. The illustration of *Williamia* labelled *peltoides* which Dall included (1870, p. 1, 4, fig. 11a, b) could not be of the Carpenter type. Dall (1921) indicated that the specimen was *W. vernalis*, which he regarded at the later date as distinct from *W. peltoides*.

The syntypes were young individuals. The measurements which the writer made of the larger of the two approximate those of Carpenter (.14 by 25.3 mm. = 3.54 mm. long.; .11 by 25.3 mm. = 2.78 mm. lat.). The writer, therefore, selects the larger of the two syntypes as the lectotype of this species. The illustration is reserved for a later report. The Redpath paratypes also approach the typical measurements. A figure of the larger of the two specimens is included herein.

Dall stated (1870) "after a careful study of the types," that *Nacella subspiralis* Carpenter belonged to the same species as *W. peltoides* as well as *Nacella* ? *vernalis*. The name of the latter was given in manuscript by Dall (1866), but he later (1878) classified it as a variety of *Liriola peltoides*. He later separated the two as distinct species (1921).

The paratypes in the Redpath Museum are thin-shelled. They have a few faint widely separated radiating ridges. The tip of the shell is white and the remainder brownish.

*Types*.—Lectotype and paratype, U. S. National Museum, No. 4023; paratype, Redpath Museum, No. 1156

*Distribution*.—Recent. Cape San Lucas, Lower California (type), Monterey, California to Gulf of California (Burch). Pleistocene. California (Grant and Gale; Woodring, Bramlette, and Kew, 1946)

**Williamia peltoides** (Carpenter)

*Nacella subspiralis* Carpenter = *Williamia peltoides* (Carpenter)

? *Nacella subspiralis* CARPENTER, 1864b, p. 612, 650; Reprint, 1872, p. 98, 136; 1866, California Acad. Sci., Proc., vol. III, p. 213; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 23; PILSBRY, 1891, Man. Conch., vol. XIII, p. 154 Siphonariidae.

*Siphonaria peltoides* (Carpenter), DALL, 1870, Amer. Jour. Conch., vol. VI, p. 37, 38, 39  
*Liriola subspiralis* (Carpenter), DALL, 1878, Jour. de Conchyl., vol. XXVI, p. 70 under *L. peltoides*

Not *Nacella subspiralis* WIMMER, 1879, Sitzb. K. Akad., Wiss. Wien, vol. 80, p. 41 *vide* MAXWELL SMITH, 1944, Panamic Marine Shells, p. 44

"? *Nacella subspiralis*. Cat. Is. 10-20 fm. [May be the young of the long-lost *Patella calyptra*, Mart.; unless that be a broken *Crepidula adunca*]

"? *Nacella subspiralis*, n.s. shaped like *Emarginula rosca*, and may be a *Scutellina*. 10-20 fm. Cp." [Carpenter, 1864b, p. 650]

"... State collection, 416b.

"? N.t. parva, carnea, laevi, tenuissima; vertice "*Emarginulae*" simulante, subspirali, sed apice patelloideo, adunco; t. adulta valde elevata; margine laterali antico subrecto, apice projiciente, valde remoto; postico maxima fornicato; aperturae margine antice et postice prolongato.

"Long. 0.26. lat. 0.19, alt. 0.20, div. 80°.

"Hab. Catalina Island, 10-20, fm., 4 dead. Cooper.

"This may be the young of the long-lost *Patella calyptra*, Mart. It may be a *Scutellina*. Even the genus cannot be predicted from the shell alone." [Carpenter, 1866a, b.]

Dall stated (1870, p. 38) that the type of this species was in the Smithsonian Institution, No. 11847. He made a careful study of the type and decided that it was an "abnormally elevated, dead and faded" shell of *W. peltoides*.

The type of this form was once in the U. S. National Museum and catalogued as "Cat. Cp. 416a [b in description] Catalina Id. Cooper. Type 1 spec."

Harald Rehder (Personal communication) stated that the specimen has since been lost.

Family ELLOBIIDAE

Genus **Melampus** Montfort, 1810

*Melampus* MONTFORT, 1810, Conchyl. Syst., vol. 2, p. 318-320

Type species by original designation, *Bulimus coniformis* BRUGUIÈRE = *Bulla coffea* LINNAEUS, 1758, Syst. Nat., 10th ed. p. 729. Recent. Cedar Keys to West Indies. PERRY AND SCHWENGEL, 1955, Marine Shells of the Western Coast of Florida, pl. 39, fig. 286

**Melampus olivaceus** Carpenter

*Melampus olivaceus* CARPENTER, 1857, Rept. Brit. Assoc. Adv. Sci. 1856, p. 233, 251, 284, 315, 351; 1857, Cat. Reigen Coll. Mazatlan, p. 178 described; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 5; 1864b, p. 621, 647, 665, 673; Reprint, 1872, p. 107, 133, 151, 159; BINNEY, 1865, Smith. Misc. Coll., no. 143, pt. II, p. 9; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 18; DALL, 1885, U. S. Nat. Mus., Proc., vol. 8, no. 18, p. 283, pl. 18, fig. 16; KEEP, 1887, West Coast Shells, p. 124; COOPER, 1888, 7th Rept. California State Min. Bur., p. 250; WILLIAMSON, 1892, U. S. Nat. Mus., Proc., vol. 15, no. 898, p. 196; ARNOLD, 1903, p. 197; DALL, 1921, p. 66; OLDBROYD, 1927, vol. II, pt. 1, p. 54, pl. 1, fig. 16 copy Dall; GRANT AND GALE, 1931, p. 461, pl. 24, fig. 10; BAILY, 1935, West Coast Shells (KEEP), p. 277, fig. 293; KEEN, 1937, p. 40; BURCH, 1945, no. 48, p. 11; WOODRING, BRAMLETTE, AND KEW, 1946, U. S. Geol. Sur., Prof. Paper 207, p. 78; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 181

Carpenter described this species from Mazatlan, and therefore the figuring of the type belongs with the illustration of the catalogue of the Mazatlan Mollusca (Carpenter, 1857). The type should be in the British Museum. In papers by Carpenter in the same year as the

description (1857) Carpenter reported the species from San Diego. Later he listed it from the same area, Santa Barbara group of islands, and Lower California.

*Distribution*.—Recent. Mazatlan, Mexico (type); Monterey, California<sup>133</sup> to Mazatlan, Mexico (Dall). Pleistocene. California (Arnold; Grant and Gale; Willett, 1937; Woodring, Bramlette, and Kew) Mexico (Jordan, 1926)

#### Class AMPHINEURA

Because Carpenter died before his large chiton monograph was completed, various manuscript names of that group crept into literature. Many were first introduced by Dall without proper diagnoses and in some cases with a manuscript name of the type species. Some of those names are now credited to Carpenter and some to Dall. Technically Carpenter should not receive credit, and there is grave doubt that Dall's introduction of the names was adequate to establish him as author. See discussion under individual species.

Pilsbry carefully and explicitly explained in the "Preface" to the monograph of the Polyplacophora (1892, p. iv) that the types were Carpenterian in cases where the new species were credited to Carpenter, and the descriptions were quoted from his manuscript. Where the original description was that of Pilsbry, the types would be those of Pilsbry and would be in the Academy of Natural Sciences at Philadelphia. In the explanation of plates (1892, p. 334), acknowledgment of the work of Foord, Smith, and Emerton, prepared under Carpenter's supervision, is a clue to what figures were of specimens in the Carpenter Collection. Specimens which were utilized by Pilsbry other than Carpenter individuals are indicated as drawn by Pilsbry or Ross.

Following the above rule the writer tried to analyze accordingly the matter of author and type credit of the Pilsbry-Carpenter chiton names. In some cases it is difficult to render a strict ruling. But in most cases Dr. Pilsbry's distinction is apparent and defined. However, in no case where Carpenter ms. names are described for the first time in Pilsbry can Carpenter be the sole author as referred in Dall (1921, *c.g.* p. 190, "*Stenoplax fallax* Carpenter, 1892"). His references are misleading to workers not familiar with the literature and can cause unnecessary labor in hunting for such a reference. If Carpenter is to be credited, the less confusing is "Carpenter in Pilsbry," or a similar modified form. The confusion of Carpenter manuscript names has been continued in recent literature, *c.g.*, "*Callistochiton* Carpenter, 1882" (LaRocque, 1953, p. 12), "*Nuttalina* Carpenter, 1873" (LaRocque, 1953, p. 11), "*Stenoradsia* Carpenter, 1878," "*Placiphorella* Carpenter, 1878," and "*Nuttalina* Carpenter, 1879" (Abbott, 1954, p. 314). For the status of those manuscript names and others of Carpenter, see the list of Carpenter's generic names in this monograph.

Many of the chiton types had been preserved for so long in a curved position that the measurement of length implies the dimension of the line which subtends the curvature of the specimen.

#### Family LEPIDOPLEURIDAE

#### Genus *Leptochiton* Gray, 1847

*Leptochiton* GRAY, 1847, Zool. Soc. London, Proc., p. 127

Type species by subsequent designation, GRAY, Zool. Soc. London, Proc. 1847, p. 168, *Chiton cinereus* = <sup>134</sup> "*Montagu* = Ch. asellus, *Lowe Zool. Jour.* var. white, *Chiton albus*," [not

<sup>133</sup> Smith and Gordon do not report it from Monterey.

<sup>134</sup> This type designation, specific name without author, cannot be taken without reference to the original description or mention of the generic name. A type species designation must be one that was listed in the original description. Therefore, the authorship of *C. cinereus* rests upon Gray's mention (p. 127) which is as follows: "*Leptochiton cinereus*. *Chiton cinereus*, *Montague* [sic] = Ch. asellus, *Lowe, Zool. Jour.* var. white, *Chiton albus*." The difficulty which has arisen in the pronouncement of the type species of this genus is in the interpretation of the above paragraph. If Gray regarded the first mention of *L. cinereus* as of Linnaeus (1767, p. 1107) then Linnaeus would be assumed as author (p. 168), and *C. cinereus* *L.* would be the type species of *Lepidochiton*. The genus would be different than that assumed by present West Coast workers. The other interpretation would be as Gray stated in the

*C. cinereus* Linnaeus]. Recent. Circumboreal. Northern Europe; Greenland to Massachusetts Bay; Arctic Ocean to San Diego, California

For the differences between "*Leptodpleurus asellus* (Spengler)" and "*Trachydermon cinereus* (Linnaeus)," see Christiansen (1954).

"*Leptochiton crassus* Carpenter" *nomen nudum*

There is a specimen in the Redpath Museum (no. 11) labelled by Carpenter "*Leptochiton crassus* Cpr. 'unique type' S. Diego under rocks in sand extreme low tide Hemphill."

The writer has found no reference to such a species in literature. It apparently applied to a species which Carpenter intended to describe.

*Leptochiton internexus* Carpenter *in* Pilsbry

(Pl. 28, figs. 3-6)

*Lepidopleurus internexus* Carpenter ms., *in* PILSBRY, 1892 *Man. Conch.*, vol. XIV, p. 12; DALL, 1921, p. 186 section *Lepidochiton*; OLDROYD, 1927, vol. II, pt. III, p. 247 section *Leptochiton*

*Leptochiton internexus* (Carpenter), DALL, 1878, *U. S. Nat. Mus.*, vol. I, p. 316, 319; SMITH *in* BURCH, 1947, no. 66, p. 5; BURCH, 1947, no. 66, p. 17

*Lepidopleurus (Leptochiton) internexus* ("Carpenter"), BAILY, 1935, *West Coast Shells* (Keep), p. 28

Pilsbry used Carpenter's ms. name for this species and quoted Carpenter's description. Therefore, the holotype is that of Carpenter. It is in the U. S. National Museum and figured herein for the first time. The type has the label, "Cp. 1080 P. P. Carpenter Type." The species, however, should not be credited to Carpenter alone as it has been.<sup>135</sup>

Oldroyd (1927) republished the original description from Pilsbry.

*Dimensions*.—Length (tangent to arc) 4.5 mm.; width 3+ mm. (type)

*Holotype*.—U. S. National Museum, no. 30750

*Distribution*.—Santa Barbara, California (type); Belkoffski, Alaska, to San Diego, California (Dall)

*Leptochiton nexus* Carpenter

(Pl. 28, fig. 2)

*Lepidochiton nexus* CARPENTER, 1864b, p. 612, 650; Reprint, 1872, p. 98, 136; 1866, *California Acad. Sci., Proc.*, vol. III, p. 212; COOPER, 1867, *Geog. Cat. Moll., Geol. Sur. California*, p. 23; DALL, 1878, *U. S. Nat. Mus., Proc.*, vol. I, p. 316, 319; PILSBRY, 1892, *Man. Conch.*, vol. XIV, p. 11; SMITH *in* BURCH, 1947, no. 66, p. 6; BURCH, 1947, no. 66, p. 17; SMITH AND GORDON, 1948, *California Acad. Sci., Proc.*, ser. 4, vol. XXVI, p. 205 Pacific Grove record needs confirmation

*Chiton (Leptochiton) nexus* Carpenter, DALL *in* ORCUTT, 1886, *U. S. Nat. Mus.*, vol. 8, p. 544

*Lepidopleurus nexus* (Carpenter), DALL, 1921, p. 187 section *Xiphiozona*; OLDROYD, 1927, vol. II, pt. III, p. 251 section *Xiphiozona*; WILLET, 1935, *Nautilus*, vol. 49, no. 2, p. 42 includes *L. heathi* BERRY, 1919, *California Acad. Sci., Proc.*, ser. 4, vol. IX, no. 1, p. 6 and *L. ambustus* DALL, 1919, *U. S. Nat. Mus., Proc.*, vol. 55, p. 499 as synonymous

*Lepidopleurus (Xiphiozona) nexus* Carpenter), BAILY, 1935, *West Coast Moll.* (KEEP), p. 28

"Like *asellus*: scarcely sculptured; mantel-margin with striated chaffy scales, like *Magdalensis*, interspersed with transparent needles. 20-80 fm. Cp." [Carpenter, 1864b, p. 650]

first writing of the name. *C. cinereus* Montagu [not Linnaeus] = *C. albus* [Linnaeus, 1767]. This is the interpretation followed herein and by modern West Coast students (not Dall, 1921).

<sup>135</sup> It is confusing to use the expressions as in Dall (1921, p. 186, 190, 191, 192, 194, 196) "Carpenter, 1892" and "Carpenter, 1878" meaning "Carpenter *in* Pilsbry, 1892" and Carpenter *in* Dall, 1878." Since Carpenter died in 1877 there are no publications by him of those dates. To persons not familiar with the history of the literature of West Coast chitons such references may entail needless work.

Pilsbry (reprinted by Oldroyd, 1927) published a translation of Carpenter's detailed Latin description (1866). The lines not included by Pilsbry are:

"Long. 0.30, lat. 0.18; div. 90°.

"*Hab.* Catalina Island, 10-20 fm. *Cooper.*

"The appearance of this northern genus among the Mopaliae and Ischnochitons is very remarkable; as is the character of the mantlemargin." [Carpenter, 1866, p. 213]

The holotype has a printed label, "Type Catalina Id. Cooper." The posterior and anterior plates (one broken) are separate from the remainder of the specimen which is intact. The surface has fine striae. The sides are mottled, but there is lack of color down the middle. The beaks are slightly pointed.

*Holotype.*—U. S. National Museum, no. 16270

*Distribution.*—Recent. Catalina Island, California (type), Catalina Island, to Gulf of California (Dall). See Table 2 for stratigraphic distribution

### **Leptochiton rugatus** (Pilsbry)

(Pl. 28, fig. 7; Pl. 35, fig. 3)

*Lepidopleurus rugatus* "Carpenter," PILSBRY, 1892, *Man. Conch.*, vol. XIV, p. 11, pl. 3, figs. 67-70 "*Leptochiton* (? *internexus* var.) *rugatus* Cpr. ms., p. 3"; THIELE, 1909, *Zoologica*, Bd. 22, Heft 56, p. 12, pl. 1, figs. 41-50; DALL, 1921, p. 186 section *Leptochiton*; OLDROYD, 1927, vol. II, pt. III, p. 247 section *Leptochiton*

*Leptochiton rugatus* (Pilsbry), SMITH in BURCH, 1947, no. 66, p. 6; Burch, 1947, no. 66, p. 17; SMITH AND GORDON, 1948, *California Acad. Sci., Proc.*, ser. 4, vol. XXVI, p. 205

According to the indication of the original description this species should be credited to Pilsbry, and the types are those (three) in the Academy of Natural Sciences at Philadelphia.

The label with the three syntypes reads, "near San Tomas River L. Cal. H. Hemphill" (Pilsbry, May 15, 1951, personal communication). Material consisting of five specimens and an extra plate in the U. S. National Museum is labelled "Type San Diego H. Hemphill (Todos Santos)." The specimen is figured herein. However, the specimens defined as types by Pilsbry in the Academy of Natural Sciences are the true types. The species was figured by Pilsbry.

*Syntypes.*—Academy of Natural Sciences, Philadelphia, no. 35586

*Distribution.*—Near San Tomas River, Lower California (type); Monterey, California, to Todos Santos Bay, Lower California (Pilsbry)

### Family LEPIDOCHITONIDAE

#### Genus **Lepidochitona** Gray, 1821

(*Craspedochilus* Sars, 1878)

*Lepidochitona* GRAY, 1821, *London Medical Repository*, vol. XV, p. 234. Typographical error *Leptochitona* in PILSBRY, 1892, *Man. Conch.*, vol. XIV, p. 150; IREDALE, 1914, *Malacol. Soc. London, Proc.*, vol. 11, p. 127

Type species by monotypy, *Chiton marginatus* [PENNANT], 1777, *British Zool.*, vol. IV, p. 60, pl. 36, fig. 2. Recent. Northern Europe

Pilsbry (1892, p. 69) referred *C. marginatus* Pennant (and of other British authors) to *Ischnochiton* (*Trachydermon*) *cinereus* Linnaeus (Committee Conch. Soc., 1901, *Jour. Conch.*, vol. X, p. 10).

#### Genus **Cyanoplax** Pilsbry, 1892

*Cyanoplax* PILSBRY, 1892, *Man. Conch.*, vol. XIV, p. 40

Type species by original designation, *Cyanoplax hartwegii* (Carpenter), 1855, *Zool. Soc. London, Proc.*, p. 231. Living. Forrester Island, Alaska, to Gulf of California. (pl. 27, figs. 8-10; pl. 28, figs. 8-15)

See discussion of *Trachydermon* Carpenter, 1864, under *Basiliochiton* Berry.

**Cyanoplax hartwegii** (Carpenter)

(Pl. 27, figs. 8-10; Pl. 28, figs. 8-15)

*Chiton hartwegii* CARPENTER, 1855, Zool. Soc. London, Proc., p. 231; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 287, 318, 349 genus indet.; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 3

*Trachydermon Hartwegii* CARPENTER, 1864b, p. 649; Reprint, 1872, p. 135; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22; 1871, Jour. Conch., vol. VI, p. 59; PILSBRY, 1894, Nautilus, vol. 8, no. 4, p. 45 subgenus *Cyanoplax*; THIELE, 1909, Zoologica, Bd. 22, Heft 56, p. 16, pl. II, figs. 26, 27; 1910, Zoologica, Bd. 22, Heft 56, p. 107

*Chactopleura Hartwegii* (Carpenter), DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 329 copy Cpr. ms.

*Chiton (Chactopleura) hartwegii* Carpenter, DALL in ORCUTT, 1886, U. S. Nat. Mus., Proc., vol. 8, p. 544

*Tonicella (Cyanoplax) hartwegii* (Carpenter), PILSBRY, 1892, Man. Conch., vol. XIV, p. 45, pl. 14, figs. 81-85; BAILY, 1935, West Coast Shells (KEEP), p. 29

*Lepidochitona hartwegii* (Carpenter), DALL, 1921, p. 189 section *Cyanoplax*; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 187; 1927, vol. II, pt. III, p. 260

*Cyanoplax hartwegii* (Carpenter), THIELE, 1909, Zoologica, Bd. 22, Heft 56, p. 4, 7, 16; BERRY, 1922, California Acad. Sci., Proc., ser. 4, vol. XI, p. 435, pl. II, figs. 6-8 see for additional synonymy; SMITH AND GORDON, 1848, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 205

*Lepidochiton (Cyanoplax) hartwegii* (Carpenter), THIELE, 1929, Handbuch, Teil I, p. 8

Oldroyd (1927) furnished a copy of the original description as well as the supplementary notes by Pilsbry. The following lines should be added to the copy of Oldroyd to make that copy complete:

"Long. 1.26, lat. .76, alt. .18 poll.

"*Hab.* Monterey, cum praecedente: legit idem diligentissimus. Mus. Cuming.

"A much smaller shell than the last, almost destitute of sculpture; with a blackish spot on each side of the jugum, but no radiating lines." [Carpenter, 1855, p. 231]

There are three units (1 small complete specimen; 1 of 8 separate plates; 1 of 3 plates off + 5 intact) of specimens in the Redpath Museum labelled in Carpenter's handwriting on his glass mount. The label is as follows: "? C. Hartwegii Cpr. type Monterey H. Cuming."

The black or brownish patches on each side of the jugum mentioned by Carpenter are conspicuous on the syntypes. In the small young specimen the blackish patches meet irregularly in the center.

*Syntypes*.—Redpath Museum, no. 68

*Distribution*.—Recent. Monterey, California (type); Forrester Island, Alaska, to the Gulf of California (Dall). Pleistocene. California (Berry; Chace and Chace)

**Cyanoplax hartwegii nuttalli** (Carpenter)See *C. hartwegii* (Carpenter)

(Pl. 27, fig. 11)

*Chiton nuttalli* CARPENTER, 1855, Zool. Soc. London, Proc., p. 231; 1856, Zool. Soc. London, Proc., p. 221; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 3

*Trachydermon Nuttalli* CARPENTER, 1864b, p. 627, 649; Reprint, 1872, p. 113, 135 COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 23; 1871, Amer. Jour. Conch., vol. VI, p. 59; PILSBRY, 1894, Nautilus, vol. VIII, no. 4, p. 46 subgenus *Cyanoplax*

*Chactopleura Nuttalli* (Carpenter), DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 330

*Tonicella (Cyanoplax) hartwegii nuttalli* (Carpenter), PILSBRY, 1892, Man. Conch., vol. XIV, p. 46

*Lepidochitona hartwegii nuttalli* (Carpenter), DALL, 1921, p. 189; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 188; 1927, vol. II, pt. III, p. 261

*Cyanoplax hartwegii nuttalli* (Carpenter), SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, no. 8, p. 205 young of *C. hartwegii*

Part of the original description was republished by Oldroyd (1927). The following lines should be added to make that copy complete:

"*Hab.* Monterey, cum praecedentibus; legit idem diligentissimus et olim, primus in eas oras perscrutator, clarissimus T. Nuttall. Mus. Cuming et Nuttall.

"A small specimen in Mr. Cuming's collection was passed over as the young of *C. Hartwegii*; but a fine one in Mr. Nuttall's collection distinctly displays the points of difference above indicated, which at present appear of specific value. This specimen has much the appearance of a young *Ch. articulatus*, but differs essentially in the character of the ligament." [Carpenter, 1855, p. 232]

G. L. Wilkins (personal communication, October 17, 1950) obligingly furnished the following information in regard to possible type specimens in the British Museum:

"We have a specimen of *Chiton nuttalli* Carpenter. Were it not for the fact that it is marked 'Mus. Cuming' it might well have been the small specimen as 'passed over' on p. 232 P.Z.S. 1855. It is too small for the type. The locality is given as 'Santa Barbara'—perhaps a paratype?"

Since the small specimen "passed over" should be from "Mus. Cuming," the specimen referred to by Wilkins could possibly be the one mentioned by Carpenter. The locality does not correspond to what might be intimated by Carpenter in the description. The only reference to "Santa Barbara" by Carpenter is to the "Santa Barbara group of islands (1864b, p. 649; 1872, p. 135)

Smith and Gordon (1948, p. 205) expressed the opinion that this form is the young of *C. hartwegii*.

The included photograph of the holotype has been co-operatively furnished by the officials of the British Museum (Natural History), G. L. Wilkins of the Mollusca Section, ferreted out the specimen and described its status and measurements (Personal communication, March 2, 1951 and July 10, 1951).

*Holotype*.—British Museum (Natural History), 61.5.20.102

*Distribution*.—Monterey, California (type)

#### Cyanoplax dentiens (Gould)

*Chiton dentiens* GOULD, 1846, Boston Soc. Nat. Hist., Proc., vol. 2, p. 145

*Chiton (Onithochiton) dentiens* GOULD, 1852, U. S. Expl. Exped., Moll., p. 321, pl. 28, figs. 433-433b

*Ischnochiton pseudodentiens* CARPENTER, 1864b, p. 530, 606 = *C. dentiens* Gould type; Reprint, 1872, p. 16, 92

*Ischnochiton (Trachydermon) pseudodentiens* CARPENTER, 1864b, p. 612; Reprint, 1872, p. 98; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 60

*Trachydermon pseudodentiens* (CARPENTER), 1864b, p. 649 = type of *C. dentiens*; Reprint, 1872, p. 135; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22

*Ischnochiton (Trachydermon) dentiens* (GOULD), PILSBRY, 1892, Man. Conch., vol. XIV, p. 73, pl. 8, figs. 61-65

*Lepidochitona dentiens* (GOULD), DALL, 1921, p. 188; BURCH, 1947, no. 66, p. 18

*Cyanoplax dentiens* (GOULD), BERRY, 1948, Leaflets in Malacology, vol. 1, no. 4, p. 13, 14

Carpenter was explicit in explaining that his name *I. pseudodentiens* was created for the type of Gould's *Chiton dentiens*. Therefore, there is no question as to the synonymy of Carpenter's name with the earlier of Gould. As Pilsbry (1892) explained Gould had mistaken spots for denticles. Carpenter noted the fact and supposed a new name was required.

The type of "*Chiton dentiens*" Gould is in the U. S. National Museum, no. 5824. Two other suites of supplementary material of the species, which were labelled by Carpenter in connection with his name *pseudodentiens*, are labelled types in the U. S. National Museum.

A complete synonymy or discussion of *C. dentiens* (Gould) is not intended in this report.

#### Genus Nuttallina Dall, 1871

*Nuttallina* DALL, 1871, Amer. Jour. Conch., vol. VII, p. 134

Type species by monotypy, *N. scabra* (Reeve) CARPENTER = *Chiton Californicus* [Nuttall, ms.] REEVE, 1847, Conch. Icon., vol. 4, *Chiton*, pl. XVI, fig. 89. Living. Strait of Juan de Fuca to San Diego, California. PILSBRY, 1892, Man. Conch., vol. XIV, pl. 54, figs. 23, 25, pl. 56, figs. 12-18

#### *Nuttallina fluxa* (Carpenter)

(Pl. 28, figs. 16-19)

*Chiton scaber* REEVE, 1847, Conch. Icon., vol. IV, *Chiton*, pl. XVII, fig. 106. Not *Chiton scaber* BLAINVILLE, 1825

*Acanthopleura fluxa* CARPENTER, 1864b, p. 612, 649; Reprint, 1872, p. 98, 135; 1866, California Acad. Sci., Proc., vol. III, p. 211; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22 "Catalina I or Santa Barbara I, Cal."

*Nuttalina scabra* (Reeve), PILSBRY, 1892, Man. Conch., vol. XIV, p. 281 in part, pl. 54, figs. 21, 22, pl. 56, figs. 19, 20

*Nuttalina fluxa* (Carpenter), DALL, 1921, p. 190; OLDROYD, 1927, vol. II, pt. III, p. 264; SMITH in BURCH, 1947, no. 66, p. 16; BURCH, 1947, no. 66, p. 18

"Green, mottled with orange-red; not beaked; with only marginal and diagonal ribs." [Carpenter, 1864, p. 649]

"A.t. "*A. scabrae*" simili, sed latiore, pallidior; viridi, rubroaurantio conspersâ; valvis rectangulatis; suturis marginalibus haud conspicuis; areis diagonalibus satis distinctis; radiis obtusis fluxis ii., altera diagonali, altera suturali; tota superficie conspicue granulosa; granulis acutioribus praesertim albidus; jugo obtuso, vix vallato: laminis insertionis ut in *A. scabra* instructis.

"Long. 0.60, lat. 0.40, div. 110°.

"Hab. Santa Barbara Island, Cooper

"Foot, in the only dried specimen seen, extremely thin, flat, and narrow." [Carpenter, 1866a, p. 211]

The holotype in the U. S. National Museum consists of one specimen with three plates removed. It is labelled "*Nuttalina fluxa* Cpr. = *N. scabra* Reeve (Type) Sta. Barbara Cooper." Another label which is crossed off reads, "*Acanthopleura fluxa* Cpr. Type Sta. Barbara Cooper."

Oldroyd republished the parts of the notes by Pilsbry in regard to *N. californica* [Nuttall] (Reeve) and *N. scabra* Reeve and this species.

*Holotype*.—U. S. National Museum, no. 15690b

*Distribution*.—Santa Barbara Islands, California (type); Point Conception, California, to Gulf of California (Dall)

#### Family CHAETOPLEURIDAE

#### Genus *Chaetopleura* Shuttleworth, 1853

*Chaetopleura* SHUTTLEWORTH, 1853, Mitt. naturf. Ges. Bern, p. 190

Type species by subsequent designation, DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 296, 329 *Chiton peruvianus* LAMARCK, 1819, An. s. Vert., vol. VI, p. 321. Living. Peru to Cape Horn. PILSBRY, 1892, Man. Conch., vol. XIV, pl. 12, figs. 42-46

#### *Chaetopleura beanii* (Carpenter)

? *Lefidopleurus Beanii* CARPENTER, 1857, Rept. British Assoc. Adv. Sci. 1856, p. 252, 317; 1857, Cat. Mazatlan Shells, p. 197; 1860, Smith. Misc. Coll., vol. 2, art. 6, check list 2, p. 5

*Chaetopleura beanii* (Carpenter), PILSBRY, 1892, Man. Conch., vol. XIV, p. 32; DALL, 1921, p. 193; OLDROYD, 1927, vol. II, pt. III, p. 286; BURCH, 1947, no. 66, p. 18; 1947, no. 68, p. 4

This species was described by Carpenter from Mazatlan. The types (1 specimen and 2 valves) should be in the British Museum (Natural History). The figuring of the species belongs with the illustration of the types of the Mazatlan Catalogue and is not included herein. The brief discussion is inserted because the range of the species has been extended to Unalaska, Alaska (Dall).

#### *Chaetopleura gemma* "Dall", Pilsbry

(Pl. 29, figs. 1-4; Pl. 30, fig. 6)

*Chaetopleura gemma* "Cpr.", DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 296, pl. 1, fig. 9; CARPENTER *ms.* in PILSBRY, 1892, Man. Conch., vol. XIV, p. 31, pl. 13, figs. 69-74 *C. gemma*; DALL, 1921, p. 193 *C. gemma*; BERRY, 1922, California Acad. Sci., Proc., Ser. 4, vol. XI, no. 18, p. 460, pl. VIII, figs. 10-12; OLDROYD, 1927, vol. II, pt. III, p. 286 *C. gemma*; BURCH, 1947, no. 66, p. 18; 1947, no. 68, p. 4; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 207

This species is another of which the radula only was described first by Dall. He used the manuscript name of Carpenter as did Pilsbry later (1892). Pilsbry, however, gave a



complete description and drawing of his own using one of Emerton's illustrations which had been supervised by Carpenter.

Whether the specific name dates from Dall (*C. gemma*) or Pilsbry (*C. gemmea*), the original Carpenter types can be used as syntypes. The Emerton drawing was probably of the type. Five specimens in the Carpenter Collection in the Redpath Museum are on the original glass mounts with a Carpenter label, "type Monterey Canfield."

There are also in the Redpath Museum (no. 71) two specimens labelled "Chaetopleura gemma var. limata type Monterey Canfield (comp. lanuginosus)." There is no record of publication of this varietal name.

*Syntypes*.—Redpath Museum, no. 49

*Distribution*.—Recent, Monterey, California (type); Monterey, to Magdalena Bay, Lower California (Dall). Pleistocene, California (Berry)

#### Chaetopleura parallela (Carpenter)

*Ischnochiton parallelus* CARPENTER, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 314; Reprint, 1872, p. 212; 1864b, p. 618; Reprint, 1872, p. 104

*Chaetopleura lurida parallela* (Carpenter), PILSBRY, 1892, Man. Conch., vol. XIV, p. 34, pl. 12, fig. 50

*Chaetopleura parallela* (Carpenter), DALL, 1921, p. 193; OLDROYD, 1927, vol. II, pt. III, p. 287; BURCH, 1947, no. 66, p. 18; no. 68, p. 4 cf.

The original description of this species was republished by Oldroyd (1927).

Corrections to be made in her copy are: last line: read "disjunctis" for "disjectus"; read .7 for 7; .48 for 48; .16 for 16. Add: "Belongs to the group with minute setose scales."

This species was described from Cape San Lucas, Lower California. A specimen (one complete and separate plates) in the U. S. National Museum is labelled "cotype." There is also a specimen in the Carpenter Collection, Redpath Museum, on an original glass mount with a Carpenter label, "type C. S. Lucas Xantus ? = *Columbiensis*."

Since the types belong to the Lower California fauna the illustrations will be included in the report of these types.

*Syntypes*.—U. S. National Museum, no. 4017; Redpath Museum, no. 46

*Distribution*.—Cape San Lucas, Lower California (type); San Diego, California, to Cape San Lucas, Lower California (Dall); West Colombia (Burch)

#### Chaetopleura prasinata (Carpenter)

*Ischnochiton* (? var.) *prasinatus* CARPENTER, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. XIII, p. 315; Reprint, 1872, p. 213; 1864b, p. 618; Reprint, 1872, p. 104

*Chaetopleura lurida* Sowerby var. *prasinata* (Carpenter), PILSBRY, 1892, Man. Conch., vol. XIV, p. 34

*Chaetopleura prasinata* (Carpenter), DALL, 1921, p. 193; OLDROYD, 1927, vol. II, pt. III, p. 287; BURCH, 1947, no. 68, p. 4 cf.

Oldroyd (1927) furnished a copy of the original. Corrections to be made in her copy are: read .8 for 8; read .4 for 4; add "div. 125°."

The holotype has a label "Cape San Lucas type (= *lurida* Sby var)." It is composed of separate plates.

The illustration of the holotype will be included in the report on the types of Carpenter species which occur below San Diego, California.

*Holotype*.—U. S. National Museum, no. 15892

*Distribution*.—Cape San Lucas, Lower California (type); San Diego, California, to Cape San Lucas (Dall)

#### Subgenus *Pallochiton* Dall, 1879

(*Hemphillia* Carpenter, ms.)

*Pallochiton* DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 297; 1882, U. S. Nat. Mus., Proc., vol. 4, p. 287

Type species by monotypy, *P. lanuginosus* [Carpenter, ms.] DALL, 1879, U. S. Nat. Mus.,

Proc., vol. 1, p. 297. Recent. San Diego, California, to San Ignacio Lagoon, Lower California. (pl. 27, fig. 7)

The authorship and date of the establishment of the above generic name is involved in the same technicality as that of the type species. In the first reference cited Dall used several of Carpenter's manuscript names, both generic and specific. In the case of the specific names he described only the dentition of the radula. If this case can be construed as belonging under Article 27, Int. Rules of Zoölogical Nomenclature, the names so introduced by Dall (1879) are available. *Pallochiton* would date from Dall, 1879, because the name of its monotype is validated at the same time. Dall, 1882, is usually given for *Pallochiton*. If the validity of *Pallochiton* and *P. lanuginosus* is not accepted as of Dall, 1879, then the same names would date from Dall, 1882, the generic and specific description being synonymous.

***Pallochiton lanuginosus* "Dall"**

***Pallochiton lanuginosus* Pilsbry**

(Pl. 27, fig. 7)

*Hemphillia lanuginosa* CARPENTER, ms.

*Pallochiton lanuginosus* CARPENTER, ms., DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 297, pl. III, fig. 21, dentition; 1882, U. S. Nat. Mus., Proc., vol. 4, p. 287

*Chiton (Pallochiton) lanuginosa* Carpenter, ms., DALL in ORCUTT, 1886, U. S. Nat. Mus., Proc., vol. 8, p. 544; CARPENTER in PILSBRY, 1892, Man. Conch., vol. XIV, p. 257, pl. 56, figs. 1-11; Dall, 1921, p. 193; OLDROYD, 1927, vol. II, pt. III, p. 291

*Chaetopleura (Pallochiton) lanuginosus [sic]* Pilsbry, BURCH, 1947, no. 66, p. 18; 1947, no. 68, p. 5

If the description and figure of the radula by Dall in 1879 validate the specific name in the case of *Ischnochiton cooperi*, *Chaetopleura gemma*, and *I. regularis*, as intimated by authors (Burch, 1947; Smith and Gordon, 1948) then the specific name of this species should date from Dall, 1879, also. In this case Dall used Carpenter's manuscript name and probably studied Carpenter's notes. Dall did not specify a type. Dall (1882), in an indirect description of *Pallochiton*, presented details of the species, *P. lanuginosus*.

There are in the Carpenter Collection in the Redpath Museum five specimens on original glass mounts with a Carpenter label "Hemphillia lanuginosus Cpr. type Todos Santos Bay Lower California H. Hemphill." An illustration of one of those complete types which reveals the beautiful sculpture is included herein.

The note in Oldroyd that the type is in the U. S. National Museum is incorrect.

Pilsbry (1892) presented a complete description of the species and used drawings made by himself as well as drawings which had been supervised by Carpenter. Pilsbry (Personal communication, May 15, 1951) considered that his description was the first and selected the specimen of Figure 4 of Plate 56 of his original illustrations as the lectotype. His types are from Pt. Abreojos, Lower California, and are in the Academy of Natural Sciences.

The several species, the names of which were published by Dall (1879) in connection with the dentition only, cannot be identified by Dall's remarks. For value to workers the authority should date with Pilsbry, 1892.

*Types*.—Syntypes: Redpath Museum, no. 66 (of Dall); lectotypes and paratypes: Academy of Natural Sciences, Philadelphia, no. 35684 (of Pilsbry).

*Distribution*.—Todos Santos Bay, Lower California (type, Dall); Pt. Abreojos, Lower California (type, Pilsbry); San Diego, California, to San Ignacio Lagoon, Lower California (Dall)

It is not correct, as in A. Smith (1955, p. 12) to use the species as of Pilsbry with the type locality of Dall. If the authorship is of Pilsbry the type locality is Pt. Abreojos, Lower California. The type locality of Todos Santos Bay applies only if Dall is used as the author.

Family ISCHNOCHITONIDAE

Genus *Ischnochiton* Gray, 1847

*Ischnochiton* GRAY, 1847, Zool. Soc. London, Proc., p. 126

Type species by subsequent designation, GRAY, 1847, Zool. Soc. London, Proc., p. 168,

*Chiton textilis* Gray, 1828, Spicilegia Zoologica, vol. I, pt. 1, p. 5, pl. 6, fig. 20. Living. Cape of Good Hope. PILSBRY, 1892, Man. Conch., vol. XIV, p. 98, 99

***Ischnochiton newcombi* Carpenter in Pilsbry**  
(Pl. 30, figs. 1-5)

*Ischnochiton newcombi* CARPENTER in PILSBRY, 1892, Man. Conch., vol. XIV, p. 120; DALL, 1921, p. 191; OLDROYD, 1927, vol. II, pt. III, p. 278; BURCH, 1947, no. 66, p. 18

Carpenter's manuscript name and description were published by Pilsbry. The holotype is figured herein for the first time. The type material consists of two specimens in the Carpenter Collection in the Redpath Museum. They are on an original Carpenter glass mount with his label, "type Catalina Is. Newcomb." There is, however, a mixture of specimens, and the two individuals do not represent the same species. Both have different sculpture. Figures 1-5 represent *I. newcombi*. There are microscopic granulations present on the central area of the valves which do not appear in the figures. The second specimen (pl. 30, fig. 6) is a worn *Chaetopleura gemma* Carpenter in Pilsbry.

*Holotype*.—Redpath Museum, no. 19

*Distribution*.—Catalina Island, California (type)

***Ischnochiton scabricostatus* (Carpenter)**  
(Pl. 30, figs. 10-12)

*Ischnochiton (Lepidopleurus) scabricostatus* CARPENTER, 1864b, p. 612, 649; Reprint, 1872, p. 98, 135; 1866, California Acad. Sci., Proc., vol. III, p. 212; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22

*Ischnochiton scabricostatus* Carpenter, PILSBRY, 1892, Man. Conch., vol. XIV, p. 121; 1893, Man. Conch., vol. XV, p. 76, pl. 16, figs. 55, 56; 1896, Nautilus, vol. 10, no. 5, p. 49; DALL, 1921, p. 191; OLDROYD, 1927, vol. II, pt. III, p. 276; BURCH, 1947, no. 66, p. 18

The holotype (1 specimen, posterior and anterior plates, free) in the U. S. National Museum is figured herein. Since up to Pilsbry's time only one specimen had been found, his drawings (1893) are presumably of the type plates. Pilsbry published (1892) a translation of Carpenter's (1866) Latin description and presented further details of description and corrections (1893). Oldroyd republished a copy of Carpenter's original description and a copy of Pilsbry's translation.

The following should be added to the copies of the description of 1866 to make those notes complete:

"Hab. Catalina Island: 10-20 fm., Cooper." [Carpenter, 1866, p. 212]  
The specimen (U. S. Nat. Mus.) is labelled "Type Catalina Id. Cooper."

*Holotype*.—U. S. National Museum, no. 16268

*Distribution*.—Catalina Island, California (type); San Pedro and Catalina Island, California, to Cerros Island, Lower California (Dall)

***Ischnochiton veredentiens* Carpenter**  
(Pl. 29, figs. 9-14)

*Ischnochiton veredentiens* CARPENTER, 1864b, p. 612, 649; Reprint, 1872, p. 98, 135; 1866, California Acad. Sci., Proc., vol. III, p. 211; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22; PILSBRY, 1892, Man. Conch., vol. XIV, p. 122; DALL, 1921, p. 191; OLDROYD, 1927, vol. II, pt. III, p. 277; BURCH, 1947, no. 66, p. 18

*Ischnochiton (Lepidozona) veredentiens* (Carpenter), SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser 4, vol. XXVI, p. 208 records of Point Ano Nuevo need confirming.

The original description of this species and the Latin description (1866) as well as Pilsbry's translation of Carpenter's description were republished by Oldroyd. The holotype is figured for the first time herein. It was no. 518a (bis) of the old California State Collection. This number was a duplicate number, as Carpenter discovered. Carpenter's label of "*Ischnochiton subexpressus* Cpr. type = *scabricostatus* Cooper no. 518a" was apparently the original 518a of Cooper's numbering.

The following line should be added to Oldroyd's copy of Carpenter to make the copy complete:

"*Hab.* Catalina Island, 20-30 fm., *Cooper.*" [Carpenter, 1866a, p. 211]

The holotype consists of separate plates. They are labelled "Catalina Id. type Cooper."

*Holotype.*—U. S. National Museum, no. 16259

*Distribution.*—Catalina Island, California (type)

#### Subgenus *Stenoplax* Dall, 1879

*Stenoplax* DALL, U. S. Nat. Mus., Proc., vol. I, p. 296, 330

Type species by original designation, *S. limaciformis* (SOWERBY), 1832, Zool. Soc. London, Proc., p. 26. Recent. Mazatlan to Lobos Islands, Peru. Florida Keys and West Indies. PILSBRY, 1892, Man. Conch., vol. XIV, pl. 16, figs. 9-16

#### *Ischnochiton (Stenoplax) acrior* Pilsbry

*Ischnochiton (Stenoplax) acrior* PILSBRY, 1892, Man. Conch., vol. XIV, p. 61, pl. 14, figs. 86-89 section *Stenoradsia*; DALL, 1921, p. 190 credited to Carpenter; OLDROYD, 1927, vol. II, pt. III, p. 268 credited to Carpenter and Pilsbry

The specific name in this case was a manuscript name of Carpenter used by Pilsbry, but the description and holotype were of Pilsbry. Credit should be to Pilsbry. It is included herein only for completeness in references to Carpenter ms. names.

*Holotype.*—Academy of Natural Sciences, Philadelphia, no. 35702

*Distribution.*—Recent. Point Abrejos, Lower California (type, from label with type, Academy of Natural Sciences, Philadelphia); San Miguel Island, California, to Gulf of California (Dall). Pleistocene. California (Berry, 1922)

#### *Ischnochiton (Stenoplax) conspicuus* "(Dall)" Pilsbry

(Pl. 35, figs. 1, 2)

*Maugerella conspicua* "Cpr," DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 296, pl. II, fig. 11

*Chiton (Maugerella) conspicua* "Cpr.," DALL in ORCUTT, 1886, U. S. Nat. Mus., Proc., vol. 8, p. 544 name only

*Ischnochiton (Stenoplax) conspicuus* PILSBRY, 1892, Man. Conch., vol. XIV, p. 63, section *Stenoradsia*, pl. 15, figs. 91-96, Carpenter ms. name and var. *solidus*, p. 64, pl. 15, fig. 97; DALL, 1921, p. 190 credit to Carpenter (*conspicuus*); BERRY, 1922, California Acad. Sci., Proc., ser. 4, vol. XI, p. 465, pl. VIII, figs. 1-9 see for additional references; DALL, 1925, U. S. Nat. Mus., Proc., vol. 66, no. 2554, p. 18, pl. 18, fig. 7 *conspicuus*; OLDROYD, 1927, vol. II, pt. III, p. 270; BURCH, 1947, no. 66, p. 18; 1947, no. 68, p. 6; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 207 Dall as author, doubtful record for Monterey

*Ischnochiton (Maugerella) conspicuus* (Carpenter), STEARNS, 1901, Nautilus, vol. 15, no. 5, p. 53

*Ischnochiton conspicuus* (Carpenter) CHACE, 1917, Nautilus, vol. 31, no. 2, p. 37 and *forma solidus* Cpr.

*Ischnochiton (Stenoradsia) conspicuus* Carpenter, BAILY, 1935, West Coast Shells (KEEP), p. 29

"Minor lateral bi-alate, top of inner wing and shaft bent into a twisted cusp with a small process extending outward from the apex of the shaft; major lateral tridentate, shaft with a keel and cuspidate process." [Dall, 1879, p. 296 dentition]

Whether this species must be credited to Dall or to Pilsbry is a technical question. Certainly Carpenter is not the author, for both Dall and Pilsbry used Carpenter's ms. name. Dall (1879) first used the name as that of the type species of *Maugerella*, also a ms. name of Carpenter's. Dall described and figured only the dentition of the radula of the species. Pilsbry gave a detailed description of the shell and illustrated the same with several drawings, two of which were made for Carpenter.

If Pilsbry is regarded as the author the holotype of the species is no. 35709,<sup>136</sup> Academy of Natural Sciences, Philadelphia, collected by Henry Hemphill from San Diego. It is probably the specimen figured by Pilsbry (pl. 15, figs. 91-93, 96).

<sup>136</sup> Not 35704 as in Oldroyd (1927, p. 270).

However, if Dall's prior remarks have precedent, a lectotype should be selected. Though Dall used Carpenter's manuscript notes for the major details of his paper (1879), he probably did not have Carpenter's type of the species in his study of the dentition. Carpenter's type remained at the Redpath Museum where it is now. There is one specimen of eight separate plates labelled by Carpenter, "original type" of *Maugerella conspicua* from La Paz collected by Pease. There are also 11 fine complete specimens labelled "type normal San Diego Hemphill Sta. Barbara Cooper (= *magdalensis*, var. *subobsoleta* B.A. Rep.)." Unfortunately the last label is of little value in determining a specific locality. There apparently is no type designated by Dall in existence, so that the Carpenter specimen is the logical shell to become the lectotype for the species of Dall's authorship. This selection would automatically change the type locality from San Diego to La Paz.

Illustration of a Carpenter specimen is included herein for completeness. The plates of the specimen are pinkish and purplish beneath the jugum.

Pilsbry included the Carpenter ms. description and drawing of a "variety *solidus*" (1892, p. 64, pl. 15, fig. 97) of a worn specimen which he regarded only as an individual variation.

*Types*.—Redpath Museum, no. 65 (Dall); Academy of Natural Sciences, Philadelphia, no. 35709 (Pilsbry)

*Distribution*.—Recent. La Paz, Lower California, or Upper California (type, Dall); San Diego, California (type, Pilsbry). Monterey, California, to Gulf of California (Dall). Pleistocene, California (Berry; Chace and Chace; Chace)

***Ischnochiton (Stenoplax) corrugatus* Carpenter in Pilsbry**

(Pl. 29, figs. 5-8)

*Ischnochiton corrugatus* CARPENTER ms. in PILSBRY, 1892, Man. Conch., vol. XIV, p. 123 subgenus *Stenoplax*; DALL, 1921, p. 192; OLDROYD, 1927, vol. II, pt. III, p. 279; BURCH, 1947, no. 66, p. 18; SMITH in BURCH, 1947, no. 68, p. 7 s.g. *Stenoplax*

Carpenter's manuscript name and description were utilized by Pilsbry (1892), who had not at that time seen a specimen of the species. The holotype is figured herein for the first time. It is in the Carpenter Collection in the Redpath Museum and has the following original Carpenter label, "type Catalina Is. 40 fms. 1070 Cooper no. 1068."

*Holotype*.—Redpath Museum, no. 37<sup>137</sup>

*Distribution*.—Catalina Island, California (type); Catalina Island, to Todos Santos Bay, Lower California (Dall)

***Ischnochiton (Stenoplax) fallax* Carpenter in Pilsbry**

(Pl. 29, fig. 15)

*Ischnochiton (Stenoplax) fallax* CARPENTER ms. PILSBRY, 1892, Man Conch., vol. XIV, p. 59, pl. 16, figs. 17, 18; DALL, 1921, p. 190; BERRY, 1922, California Acad. Nat. Sci., ser. 4, vol. XI, no. 18, p. 461, pl. VII, figs. 1-3; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 190; 1927, vol. II, pt. III, p. 267; BURCH, 1947, no. 66, p. 18; SMITH in BURCH, 1947, no. 68, p. 8; SMITH AND GORDON, 1948, California Acad. Sci., Proc., vol. XXVI, no. 8, 207

Pilsbry, as he stated, used Carpenter's manuscript description and the drawing of the holotype (1892). The holotype is in the Carpenter Collection, Redpath Museum. It bears the label, "Stenoplax fallax type Bodegas<sup>138</sup> Newcomb." The type material consists of one specimen.

Stearns (1868, p. 382) described the area of Bodega Bay where he and Newcomb made a collecting trip in 1867. No. 34 of the list of species is "Trachydermon fallax, Cpr. (mss)."

*Holotype*.—Redpath Museum, no. 64

*Distribution*.—Recent. Bodega [Bay], California (type); Vancouver Island, British Columbia to Todos Santos Bay, Lower California (Dall). Pleistocene, California (Berry)

<sup>137</sup> The statement concerning the location of the holotype in Oldroyd (p. 279) is incorrect.

<sup>138</sup> Spelling should be corrected in Palmer (1945, p. 101) to read "Bodegas" instead of "Brodegas."

Subgenus *Lepidozona* Pilsbry, 1892

*Lepidozona* PILSBRY, 1892, Man. Conch., vol. XIV, p. 55, 125

Type species by original designation, *Ischnochiton mertensii* MIDDENDORFF, 1847 (1846), Acad. Sci. St. Petersburg, Bull., vol. VI, p. 118. Recent. Sitka, Alaska, to San Martin Island, Lower California. PILSBRY, 1892, Man. Conch., vol. XIV, pl. 26, figs. 20-26

*Ischnochiton (Lepidozona) aureotinctus* Carpenter in Pilsbry

(Pl. 31, figs. 1-4)

*Ischnochiton aureotinctus* CARPENTER in PILSBRY, 1892, Man. Conch., vol. XIV, p. 123; DALL, 1921, p. 191; OLDROYD, 1927, vol. II, pt. III, p. 276; BURCH, 1947, no. 66, p. 18 subgenus *Lepidozona*

Carpenter's manuscript name and description were used by Pilsbry (1892). The holotype is in the Carpenter Collection in the Redpath Museum. It is on the original Carpenter glass mount and bears the label "type Catalina Is. 80 fms. Cooper 1071a." The 1071a refers to the catalogue number of the old California State Collection. There is a discrepancy in Carpenter's label and writings. In the description of "*Leptochiton nexus*" Carpenter (1866, p. 212) wrote "State Collection, 1071a," which is the same number he copied on the label of the holotype of *Ischnochiton aureotinctus*. The holotypes of both species, respectively, are figured herein for the first time.

The holotype is a poor specimen and inadequate for identification. It consists of four plates and a bit of the girdle. They are light orange with no sculpture except possibly microscopic pustules. It does not have the coarser striations of *I. nexus*.

*Holotype*.—Redpath Museum, no. 26

*Distribution*.—Catalina Island, California (type); Catalina Island, 80 fathoms, to Cerros Island, Lower California (Dall)

Cf. *Ischnochiton (Lepidozona) californiensis* BerryI. *pectinatus* Carpenter

(Pl. 31, figs. 5, 6)

? *Ischnochiton (Lepidopleurus) pectinatus* CARPENTER, 1864b, p. 612; Reprint, 1872, p. 98. "Cat. Is., beach."

Not *Chiton pectinatus* SOWERBY, 1840 = *Ischnochiton*

? *Lepidopleurus pectinatus* CARPENTER, 1864b, p. 649; Reprint, 1872, p. 135; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22; 1871, Amer. Jour. Conch., vol. VI, p. 59

*Ischnochiton (Lepidopleurus) pectinatus* CARPENTER, 1866, California Acad. Nat. Sci., Proc., ser. 1, vol. III, p. 211

"*Chiton (Lepidopleurus) ? pectinulatus* Cpr.," DALL in ORCUTT, 1886, U. S. Nat. Mus., Proc., vol. 8, p. 544 *nomen nudum*

*Ischnochiton clathratus* (Reeve), PILSBRY, 1892, Man. Conch., vol. XIV, p. 129 in part, section *Lepidozona*

*Lepidopleurus pectinulatus* CARPENTER, ms. in PILSBRY, 1892, Man. Conch., vol. XIV, p. 129

*Ischnochiton (Lepidozona) pectinulatus* "Carpenter," BERRY, 1922, California Acad. Sci., Proc., ser. 4, vol. XI, no. 18, p. 471, pl. X, figs. 4-6

*Ischnochiton (Lepidozona) californiensis* BERRY, 1931, Malacol. Soc. London, Proc., vol. 19, pt. V, pl. 29, figs. 1, 2

"Olive: strong sculpture over shagreened surface: side areas ribbed: outer margin and inner sutures pectinated, Beh. *Cp.*" [Carpenter, 1864b, p. 649]

". . . State Collection, no. 1073.

"Lt. '*L. Mertensii*' simili, sed omino olivaceo; areis diagonalibus radiis plerumque IV. dense tuberculiferis, radioque altero suturali tuberculis inflexis, margines valvarum pectinantibus; costis transversis crebris validis; costulis longitudinalis acutis distantibus superantibus, quarum margines suturas anticas pectinant; valv. term. ut in areis diag. sculptis, seriebus tuberculorum creberrimis; tota superficie minutissime tuberculata: intus, valvis centralibus unifissatis, terminalibus XI-XV—fissatis: scalis pallii irregularibus, confertis, minutissime longitudinaliter striatis.

"Long. 0.85, lat. 0.50, div. 110°.

"Variat: interdum aurantio nebulosa.

"*Hab.* Catalina Island, Santa Barbara Island, beach, *Cooper.*" [Carpenter, 1866a, p. 212]

There are in the Redpath Museum two complete specimens and three separate plates which were labelled by Carpenter, "Type La Paz Pease." One of those specimens is figured herein.

In the first mention of *I. pectinatus* Carpenter (1864b, p. 612) the specimen was reported from Catalina Island. The name in this reference is a *nomen nudum*. The second brief reference (1864b, p. 649), quoted above, listed specimens only from Santa Barbara Islands. The 1866 description cited Catalina and Santa Barbara Island. Lower California is not included in any of Carpenter's remarks. Therefore, the locality with the type specimens must be in error or a misplacement of labels.

As Pilsbry and Berry have pointed out the name *I. pectinatus* Carpenter is preoccupied. A possible substitute name was *I. pectinulatus* Carpenter ms. However, its introduction by Pilsbry must date the name from 1892 by Pilsbry, and it cannot be credited to Carpenter. The introduction by Pilsbry is somewhat ambiguous in its manner of connection with *I. clathratus* Reeve, and the writer agrees with Berry that it is not a strict substitute for *I. pectinatus* Carpenter.

Berry (1931) proposed the name *I. californiensis* to cover the "commonest southern Californian *Lepidozona*," but he doubted that it was a substitute for *I. pectinatus* Carpenter (1864; 1866).

Even though Carpenter's remarks (1864) are brief, his later description (1866) qualifies to validate a specific name. Berry selected a type locality when presenting a new name which is not the same as that of *I. pectinatus* Carpenter.

Unfortunately there is the nonconformity in type locality between the description and the label of the type. Hence there is uncertainty that the specimen labelled type is an authentic type. It could be compared with specimens from the northern and southern range of species and determined to what it bears the closer resemblance.

The problem of whether *I. californiensis* is a substitute name and whether it is equivalent to *I. pectinatus* Carpenter is still unsettled. Berry (1931) did not give the range of *I. californiensis*. He (1922) specified Monterey to Todos Santos Bay, Lower California, and stated that it was found in the Pleistocene of California.

*Types*.—Syntypes: *I. pectinatus* Carpenter, Redpath Museum, no. 70; holotype: *I. californiensis* Berry, S. S. Berry Collection, no. 1699; paratypes: see Berry (1931, p. 256).

*Distribution*.—Catalina Island or Santa Barbara Island, California (type) *I. pectinatus* Carpenter; La Jolla, California (type), *I. californiensis* Berry.

#### *Ischnochiton (Lepidozona) cooperi* "Dall" Pilsbry

*Ischnochiton cooperi* "Cpr.," DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 296, fig. 15 radula; PILSBRY, 1892, Man. Conch., vol. XIV, p. 127, pl. 26, figs. 27-30 types, section *Lepidozona*; DALL, 1921, p. 192 section *Lepidozona*; OLDROYD, 1927, vol. II, pt. III, p. 281 *Ischnochiton (Lepidozona) cooperi* "Carpenter," BERRY, 1922, California Acad. Sci., Proc., ser. 4, vol. XI, p. 473, pl. XI, figs. 1-12; BURCH, 1947, no. 66, p. 18; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 207 author "Dall"

The authority for this species is in the same category as *I. conspicuus*. The radula only was described and figured by Dall (1879). Pilsbry also utilized Carpenter's manuscript name (1892), but he composed his own description and used specimens from the collections of the Academy of Natural Sciences. The specific name, if Dall's description is not validated, should be credited to Pilsbry as has usually been done. Smith and Gordon date the specific name from Dall. Apparently Dall used Carpenter's manuscript notes in identifying the species. No specimen has been found which could be identified as a type for Dall's description.

*Types*.—Dall, not found; syntypes of Pilsbry, Academy of Natural Sciences, Philadelphia, no. 118659

*Distribution*.—Dall, type locality unknown; Recent. Bolinas, north of San Francisco, California (type, Pilsbry); Mendocino County, to Catalina Island, California (Dall). Pleistocene. California (Chace and Chace, 1919; Berry).

“*Ischnochiton cooperi acutior*” Dall

(Pl. 34, figs. 1-6)

See *I. cooperi*

*Ischnochiton cooperi acutior* CARPENTER ms., DALL, 1919, U. S. Nat. Mus., Proc., vol. 55, no. 2283, p. 508; 1921, p. 192; Oldroyd, 1927, vol. II, pt. III, p. 282; WILLETT, 1935, *Nautilus*, vol. 49, no. 2, p. 44

This species was never adequately described by Dall. He used a manuscript name of Carpenter's. At first he did not regard the name as representing more than a color variation of *I. cooperi* Carpenter. However, he later (1921) listed the form as a bona fide subspecies, from “San Diego to Los Animas Bay, Lower California.”

The holotype in the U. S. National Museum is labelled, “Todos Santos Bay Hemphill” and marked in red pencil “type.”

There are 11 specimens in the Carpenter Collection at the Redpath Museum which are labelled “type” by Carpenter. Five of them are from Todos Santos Bay collected by Hemphill (Redpath Museum, no. 18). Six others are labelled, “Sta. Cruz Cooper False Bay near S. Diego collected by Hemphill” (Redpath Museum, no. 8).

Since the form has not been illustrated previously the illustrations of the McGill specimens are included herein. They are not types because the subspecific name would date from Dall or later, depending on the validity of Dall's name. The problem has passed beyond the scope of Carpenter type material. The illustrations may help to determine whether Dall was correct in assigning subspecific rank. The writer includes them under *I. cooperi*.

*Holotype*.—U. S. National Museum, no. 30734

*Distribution*.—Todos Santos Bay, Lower California (type)

***Ischnochiton (Lepidozona) decipiens* Carpenter in Pilsbry**

*Ischnochiton decipiens* CARPENTER ms. in PILSBRY, 1892, Man. Conch., vol. XIV, p. 123; DALL, 1921, p. 192; OLDROYD, 1927, vol. II, pt. III, p. 282; WILLETT, 1935, *Nautilus*, vol. 49, no. 2, p. 43; BURCH, 1947, no. 66, p. 18; SMITH AND GORDON, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 207

This species bears a manuscript name of Carpenter which was validated by Pilsbry. Unfortunately the species was not figured, and the whereabouts of the type does not seem to be known. Pilsbry published Carpenter's manuscript description. That description is also available in Oldroyd who republished a copy of the same. Willett thought he knew what *I. decipiens* was and because of gradation believed that the form named *I. gallina* by Berry was merely a color form of *I. decipiens*.

In a list of chitons in Dall's handwriting in the collection in the U. S. National Museum are the following notations:

“Not in collection decipiens Cpr. 1892 Monterey.” “Not in collections decipiens Cpr. 1892 Catalina Id. to Monterey.”

*Holotype*.—Not found

*Distribution*.—Monterey, California (type); Catalina Island, to Monterey (Dall)

***Ischnochiton radians* Carpenter in Pilsbry**

(Pl. 30, fig. 13; Pl. 31, figs. 8-17)

*Ischnochiton radians* CARPENTER ms. in PILSBRY, 1892, Man. Conch., vol. XIV, p. 121; 1893, vol. XV, p. 75, pl. 16, figs. 48, 49; THIELE, 1909, Zoologica, Bd. 22, Heft 56, p. 80, fig. 62; BERRY, 1917, California Acad. Sci., Proc., ser. 4, vol. VII, p. 235; DALL, 1921, p. 191; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 191; 1927, vol. II, pt. III, p. 275; BURCH, 1947, no. 66, p. 18; SMITH AND GORDON, 1948, California Acad. Sci., Proc., vol. XXVI, no. 8, p. 207

In this case Pilsbry used Carpenter's manuscript name and description, meaning thereby to give partial credit to Carpenter. Pilsbry also mentioned that the specimen figured by him was not Carpenter's type but a secondary specimen from the Smithsonian Institution. Carpenter's original types (mentioned by Pilsbry) are in the Redpath Museum. There are four specimens mounted and labelled by Carpenter, “type Monterey Canfield.” Since the McGill specimens are more complete than that in the U. S. National Museum (No. 19471), the



writer chooses the one figured herein as the lectotype, with the remaining three Redpath Museum specimens and the U. S. National Museum specimen as paratypes. The U. S. National Museum specimen is labelled "type San Pedro Cooper."

The photographs included of the Redpath Museum specimen have been taken with the specimens blown with ammonium chloride to bring out the details of sculpture; therefore the flecked coloration does not show.

*Types*.—Lectotype: Redpath Museum, no. 25 (figured herein); paratypes: Redpath Museum, no. 25 (three specimens); U. S. National Museum, no. 19471 (2 plates figured herein)

*Distribution*.—Monterey, California (type); Prince of Wales Island, Alaska to San Pedro, California (Dall)

***Ischnochiton (Lepidozona) retiporosus* (Carpenter)**

(Pl. 30, fig. 7; Pl. 35, figs. 4, 5)

*Ischnochiton (Trachydermon) retiporosus* CARPENTER, 1864b, p. 603, 649; Reprint, 1872, p. 89, 135; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 59

*Trachydermon retiporosus* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22

*Ischnochiton retiporosus* Carpenter, PILSBRY, 1892, Man. Conch., vol. XIV, p. 75; 1893, vol. XV, p. 77, pl. 16, figs. 47 type, 50–53; DALL, 1921, p. 191; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 190; 1927, vol. II, pt. III, p. 272

*Ischnochiton (Lepidozona) retiporosus* (Carpenter), BERRY, 1917, California Acad. Sci., Proc., ser. 4, vol. VII, p. 235; BURCH, 1947, no. 66, p. 18; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 208

". . . : mantle-scales very small, close, smooth. Sp. like *scrobiculatus*, central pattern in network, 3–6 side ribs. [Carpenter, 1864b, p. 649]

"*I.t. parva, subelongata, cinerea, valde elevata, jugo arcuato; valvis subquadratis, apicibus celatis, marginibus suturalibus intus reglicatis; areis lateralibus parum definitis, costulis iii-vi. obsoletis, rotundatis, huc et illuc granis acutis, expressis, instructis; areis centralibus omnino scrobiculatis, interstitiis parvis, alte punctatis; valvis terminalibus costulis crebris, angustis, acutioribus; mucrone parum conspicuo, antrorsum sito: intus, sinu suturali lato; lamiis, utroque latere semel, valvis terminalibus circ. XII incis; limbo pallii granuloso, granulis confertis, minimis, vix elongatis, vix regularibus, haud sculptis. Long. .44, lat. .28, div. 90°.*"

"Hab.—In sinu Pugetiano specimen unicum legit Kennerley.

"Forma *I. interstincto*, Gld. et *I. scrobiculato*, Midd. convenit; indole sculpturae differt." [Carpenter, 1865, p. 59]

Pilsbry (1892) presented a translation of Carpenter's (1865) Latin description. He later (1893) included a sketch (Fig. 47) of part of one plate of the type and added a detailed description of the species.

In the Carpenter Collection in the Redpath Museum there is a mounted specimen labelled by Carpenter "*Ischnochiton subexpressus* Cpr. type = *scabricostatus* Cooper 518a 20 fms. Catalina Is." This is a manuscript name of Carpenter, although it is not so indicated on the label. A photograph of the shell is included herein, so that the record may be clear. The specimen is *I. retiporosus* Carpenter as may be seen by comparison of Pilsbry (1893, pl. 16, fig. 47) and this report (pl. 30, fig. 7). The Redpath Museum specimen has been coated with ammonium chloride to bring out details of sculpture, but this method obliterates coloration.

The note on the label, "= *scabricostatus* Cooper 518a," has not been explained. The published number of *I. scabricostatus* is "1071c" (Cooper's number, California Geological Survey); 518a was the number of "*Trachydermon gothicus*" (Carpenter, 1866a, p. 212).

*Holotype*.—U. S. National Museum, no. 4499 (No. in Pilsbry, 14917)

*Distribution*.—Puget Sound, Washington (type); Victoria, British Columbia, to San Pedro, California (Dall)

***Ischnochiton (Lepidozona) serratus* Carpenter**

(Pl. 32, fig. 5)

*Ischnochiton serratus* CARPENTER, 1864b, p. 618; Reprint, 1872, p. 104; 1864, Ann. Mag. Nat. Hist., ser. 3, vol. X111, p. 315; Reprint, 1872, p. 213; PILSBRY, 1892, Man. Conch., vol. XIV, p. 122; 1893, Man. Conch., vol. XV, p. 78, pl. 16, figs. 42–46; DALL, 1921, p. 192; OLDROYD, 1927, vol. II, pt. III, p. 278; BURCH, 1947, no. 66, p. 18 subgenus *Lepidozona*

Pilsbry (1892) included a translation of Carpenter's original description and later (1893) presented additional notes on the species. Oldroyd (1927) published a copy of both Carpenter's description and Pilsbry's translation. The following should be changed in the copy by Oldroyd to make that copy complete.

Read .34 for 34; .2 for 2

Add:

". . . div. 115°.

"Differs from *Elenensis* in the sculpture of the terminal valves." [Carpenter, 1864, p. 315]

The type of this species was in the U. S. National Museum, no. 16204, but, although the original glass mount is still present, the specimen is gone and has been for at least 5 years, according to a note with the type. The tablet has a label "type C.S.L. Xantus."

A specimen in the Redpath Museum is labelled, "Leptopleurus serratus Cpr. var. C type C. San Lucas Xanthus Pearl Id."

*Holotype*.—Formerly U. S. National Museum, no. 16204 (lost); paratype: Redpath Museum, no. 98

*Distribution*.—Cape San Lucas, Lower California (type); San Diego, California, to Gulf of California (Dall)

***Ischnochiton (Lepidozonia) sinudentatus* Carpenter in Pilsbry**

(Pl. 30, figs. 8, 9; Pl. 33, figs. 1-5)

*Ischnochiton sinudentatus* Carpenter, PILSBRY, 1892, Man. Conch., vol. XIV, p. 128; DALL, 1921, p. 192; OLDROYD, 1927, vol. II, pt. III, p. 283; BURCH, 1947, no. 66, p. 18 subgenus *Lepidozonia*; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 208 subgenus *Lepidozonia*

*Ischnochiton (Lepidozonia) cf. sinudentatus* "Carpenter," BERRY, 1922, California Acad. Sci., Proc., ser. 4, vol. XI, p. 476, pl. XII, figs. 10-17

The name of this species was a manuscript name. The name and manuscript description were utilized by Pilsbry (1892) when the name became valid. The type material consists of four specimens in the Carpenter Collection in the Redpath Museum on the original Carpenter glass mount and label. The label states, "type California." The types are figured for the first time herein.

*Syntypes*.—Redpath Museum, no. 27

*Distribution*.—Recent. Monterey, California (type); Pleistocene. California (Berry, "cf.")

**Subgenus *Rhombochiton* Berry, 1919**

*Rhombochiton* BERRY, 1919, California Acad. Sci., Proc., ser. 4, vol. IX, p. 2

Type species by original designation, *Ischnochiton regularis* (CARPENTER), 1855, Zool. Soc. London, Proc., p. 232. Recent. Mendocino County, California, to Monterey, California. (pl. 31, fig. 7)

***Ischnochiton (Rhombochiton) regularis* (Carpenter)**

(Pl. 31, fig. 7)

*Chiton regularis* CARPENTER, 1855, Zool. Soc. London, Proc., p. 232; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 287, 318 genus indet.; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 3; 1864b, p. 554 *Ischnochiton*; Reprint, 1872, p. 40

*Lepidopleurus regularis* (CARPENTER), 1864b, p. 649; 1872, Reprint, p. 135 subgenus of *Ischnochiton*; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22

*Ischnochiton regularis* (Carpenter), DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 296, fig. 14; KEEP, 1887, West Coast Shells, p. 107, fig. 93; PILSBRY, 1892, Man. Conch., vol. XIV, p. 142, pl. 18, figs. 41-46 section *Radsia*ella; ARNOLD, 1903, p. 342 in part; DALL, 1921, p. 193 *Rhombochiton*; OLDROYD, 1927, vol. II, pt. III, p. 285

*Ischnochiton (Rhombochiton) regularis* (Carpenter), BERRY, 1919, California Acad. Sci., Proc., ser. 4, vol. IX, no. 1, p. 2; 1922, California Acad. Sci., Proc., ser. 4, vol. XI, p. 470; SMITH AND GORDON, 1948, California Acad. Nat. Sci., Proc., ser. 4, vol. XXVI, p. 207; BURCH, 1947, no. 66, p. 18

The original description of this species as well as Pilsbry's extended notes were republished by Oldroyd (1927). The following should be changed in her copy: Last line, read 25 for 25.

Add:

"Var. *T. caerulea*, *strigis prope marginem subgranulosis*.

"*Hab.* Monterey; sub saxis legit—Hartweg. Mus. Cuming.

"A very similar species, but with larger scales on the margin, is from New Zealand, and at present undescribed in the Cumingian Collection." [Carpenter, 1855]

G. L. Wilkins (British Museum) supplied the following information regarding the holotype:

"There is little doubt that a shell we have labelled 'Monterey' and a reference to the P.Z.D. is the type of this species. Size o.k."

The figures of this species by Pilsbry are likely those of the type material, probably from the Carpenter ms. illustrations. The figures were drawn by Emerton under Carpenter's supervision. The included illustration was furnished by the authorities of the British Museum (Natural History).

Carpenter's references (1864b) are not cross-referenced. Under *Chiton regularis* in the index (1872, p. 35), reference is to page 40 only with the additional reference, 1857, pages 287, 318, and 1855, page 232. In the same publication (1872) index (p. 62) under *Lepidopleurus regularis*, page 135 only is indicated. On page 135 Carpenter referred *L. regularis* to "P.Z.S., p. 232", so that he referred to the same species. The following remarks were inserted:

"Subgenus of *Ischnochiton*: mantle-scales Lophyroid, generally striated. Sp. arched, green shagreened. Side lobes 2-4: eaves spongy, not projecting." [Carpenter, 1864b, p. 649: 1872, p. 135]

Fortunately this is not Carpenter's original description, for at the later date he indicated the occurrence as "California: or district north of the peninsula, generally." Originally the type locality was stipulated as Monterey.

*Holotype*.—British Museum (Natural History), Department of Zoology, B.M. 1950, 11.9.1

*Distribution*.—Recent. Monterey, California (type): Mendocino County, California, to Monterey, California (Dall). Pleistocene. (Arnold; Berry)

#### Subgenus *Tripoplax* Berry, 1919

*Tripoplax* BERRY, 1919, California Acad. Sci., Proc., ser. 4, vol. IX, no. 1, p. 1

Type species by original designation *Ischnochiton trifidus* (CARPENTER), 1864b, p. 649.

Recent. Shumagin Islands, Alaska to Puget Sound, Washington. PILSBRY, 1892, Man. Conch., vol. XIV, pl. 18, fig. 40; 1893, vol. XV, pl. 17, figs. 64-67 type

#### *Ischnochiton* (*Tripoplax*) *trifidus* (Carpenter)

*Trachydermon trifidus* CARPENTER, 1864b, p. 649; Reprint, 1872, p. 135; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22

*Ischnochiton trifidus* (CARPENTER), 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 60; PILSBRY, 1892, Man. Conch., vol. XIV, p. 141, pl. 18, fig. 40 section *Radsicella*: 1893, Man. Conch., vol. XV, p. 86, pl. 17, figs. 64, 65 type, 66, 67 section *Ischnoradsia*: DALL, 1921,

p. 193, section *Tripoplax*: OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 193; 1927, vol. II, pt. III, p. 285 section *Tripoplax*

*Isnoradsia* [sic] *trifida* Carpenter, DALL, 1871, Amer. Jour. Conch., vol. VII, p. 135

*Ischnoradsia trifida* (Carpenter), Dall, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 331

*Ischnochiton* (*Ischnoradsia*) *trifidus* (Carpenter), BERRY, 1917, California Acad. Sci., Proc., ser. 4, vol. VII, no. 10, p. 238

*Ischnochiton* (*Tripoplax*) *trifidus* (Carpenter), BERRY, 1919, California Acad. Sci., Proc., ser. 4, vol. IX, p. 1; BURCH, 1947, no. 66, p. 18

"Centre-punctures few, deep: 2-4 blunt ribs: side plates with 2 slits." [Carpenter, 1864b, p. 649]

"[I.t. elevata, ovali, rubida; valvis latis, subquadratis, apicibus vix intortis; areis lateralibus subelevatis, costis obsoletis rotundatis ii-iv; areis centralibus punctis distantibus, valde im-

pressis; valvis terminalibus ut in arcis lateralibus costatis; valva postica mucrone submediana, haud elevata: intus albida, subrosacea; valvis utraque latere maculo aurantio elongato ornatis, sinuibus centralibus parvis, expansis; marginibus externis subgrunda typice obtectis; laminis lateralibus bis, terminalibus circiter xii. incis: limbo pallii, granuloso, granis ovalibus, vix imbricatis haud striatis. Long. .75, lat. .45, div. 110°.

"*Hab.*—In sinu Pugetiano specimen unicum pisavit Kennerley." [Carpenter, 1865 p. 60]

The type of this species is composed of four loose valves in the U. S. National Museum. The illustrations by Pilsbry (1893, Pl. 17, figs. 64, 65) are of the type.

*Holotype*.—U. S. National Museum, no. 30946

*Distribution*.—Puget Sound, Washington (type); Shumagin Islands, Alaska, to Puget Sound, Washington (Dall)

#### Genus *Callistochiton* Dall, 1882

*Callistochiton* DALL, 1882, U. S. Nat. Mus., Proc., vol. 4, p. 283, 289, 290 no species mentioned

Type species by virtue of the first species<sup>139</sup> published in connection with generic name (Opin. 46, Int. Rules Zool. Nomen.), PILSBRY, 1892, Man. Conch., vol. XIV, p. 260. *Chiton pulchellus* GRAY, 1828, Spicilegia Zoologica, vol. 1, p. 1, p. 6, pl. 3, fig. 9. Living. Islay, Peru to Arica, Chile. PILSBRY, 1892, Man. Conch., vol. XIV, pl. 60, figs. 1-6

#### *Callistochiton decoratus* Pilsbry

(Pl. 33, figs. 15-21)

*Chiton* (*Callistochiton*) *decoratus* "Carpenter," DALL in ORCUTT 1886, U. S. Nat. Mus., Proc., vol. 8, p. 544 not described

*Callistochiton decoratus* CARPENTER ms., PILSBRY, 1892, Man. Conch., vol. XIV, p. 269, pl. 58, figs. 17-20; 1893, Man. Conch., vol. XV, p. 87, pl. 16, fig. 54; DALL, 1921, p. 194; OLDRÖYD, 1927, vol. II, pt. III, p. 294; BURCH, 1947, no. 66, p. 18

Although Pilsbry utilized Carpenter's manuscript name for this species, he did not use Carpenter's description or his type. Pilsbry's type was a specimen in the Academy of Natural Sciences, Philadelphia. In this case, therefore, the species should be attributed to Pilsbry and not Carpenter. The synonymy, therefore, is not intended to be complete.

In the Carpenter Collection in the Redpath Museum, there are 12 fine specimens on Carpenter's glass mounts with a Carpenter label, "type S. Diego Hemphill (Comp. *veredentiens*)." These specimens were evidently Carpenter's ms. types. Pilsbry (1893) described differences between the typical form from Lower California and an individual from San Diego collected by Henry Hemphill. The specimens which Carpenter had labelled type should fall in the category to which Pilsbry called attention. Five of those specimens are figured herein to define the variation, if any. The number of ribs on the head valve varies from 11 to 12.

Pilsbry's original description, but not the supplementary notes, was republished by Oldroyd (1927).

*Holotype*.—Academy of Natural Sciences, Philadelphia, Pa., no. 118687

*Distribution*.—Todos Santos Bay and near San Tomas River, Lower California (type); Santa Barbara, California, to San Tomas River, Lower California (Dall)

#### "*Callistochiton fimbriatus*" Carpenter ms. *nomen nudum*

Three specimens in the Redpath Museum (no. 41) are labelled by Carpenter, "*Callistochiton fimbriatus* Cpr. type Monterey Canfield."

*Callistochiton fimbriatus* Carpenter is a *nomen nudum*. The name has been frequently mentioned in literature, but Carpenter never described the species. Pilsbry was aware of the problem in connection with the name and, therefore, did not use the Carpenter name but

<sup>139</sup> The first species mentioned in connection with the generic name was *Callistochiton decoratus* "Carpenter", Dall in Orcutt (1886, p. 544). However, at that time that specific name was a *nomen nudum*, and it did not become valid until by Pilsbry, 1892. Therefore, Pilsbry's type designation has priority.

gave a new designation (*C. crassicostratus*) to the chiton which would have been described by Carpenter. Pilsbry did not believe that the use of the name by Cooper applied to the same form. The specific name was used for a chiton by Sowerby (1840).

The name is thus best dropped from literature of chitons.

References to name:

- "*Callochiton fimbriatus* Cpr. (MSS.)," COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 23 *nomen nudum*. Not *Chiton fimbriatus* SOWERBY, 1840  
 "*Chiton (Callochiton) fimbriatus* Cpr.," DALL in ORCUTT, 1886, U. S. Nat. Mus., Proc., vol. 8, p. 544; ORCUTT, 1915, Moll. World, p. 23 *nomen nudum*  
 "*Callistochiton fimbriatus* Cpr. MSS. 1875," PILSBRY, 1892, Man. Conch., vol. XIV, p. 265 = *C. crassicostratus* PILSBRY, 1892. Not *C. fimbriatus* Cpr. Cooper, see above *vide* PILSBRY, 1892  
*Chiton fimbriatus* of authors, BERRY, 1922, California Acad. Sci., Proc., ser. 4, vol. XI, no. 18, p. 484 = *Callistochiton crassicostratus* Pilsbry, 1892

#### *Callistochiton palmulatus* Carpenter in Pilsbry

(Pl. 32, fig. 1)

*Callistochiton palmulatus* CARPENTER *ms.* in PILSBRY, 1892, Man. Conch., vol. XIV, p. 262, pl. 58, figs. 12-16 typical; DALL, 1921, p. 193; OLDROYD, 1927, vol. II, pt. III, p. 292; BURCH, 1947, no. 66, p. 18; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 208

Pilsbry utilized Carpenter's manuscript name, description, and drawings. Part of the figures under the species (pl. 58, figs. 7-11) Pilsbry segregated under a subspecific name, *mirabilis* Pilsbry. The holotype of the subspecies is in the Academy of Natural Sciences, Philadelphia.

One specimen in the Carpenter Collection in the Redpath Museum is on an original Carpenter glass mount with original label, "type Sta. Barbara Cooper no. 1077." The number and locality corresponds with that given for the type by Pilsbry (1892, p. 263), which verifies the specimen as type. An illustration of the holotype is figured herein. The specimen was mounted with four plates separate.

*Holotype*.—Redpath Museum, no. 48

*Distribution*.—Recent. Santa Barbara, California (type); Monterey, California, to San Ignacio Lagoon, Lower California (Dall). Pleistocene. California (Berry, 1922, p. 407)

#### Family CHITONIDAE

##### Genus *Placiphorella* Dall, 1879

*Placiphorella* DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 298, 303, 306

Type species by original designation, *P. velata* "Cpr.," DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, pl. IV, figs. 36, 36a dentition. Recent. Vancouver Island, British Columbia, to Todos Santos Bay, California. PILSBRY, 1892, Man. Conch., vol. XIV, pl. 66, figs. 6-12

##### *Placiphorella velata* Dall

*Placiphorella velata* CARPENTER *ms.*, DALL, 1879, U. S. Nat. Mus., Proc., vol. I, p. 208, 303, 307, pl. IV, fig. 36a dentition; 1887, U. S. Nat. Mus., Proc., vol. 9, p. 210; PILSBRY, 1892, Man. Conch., vol. XIV, p. 306, pl. 66, figs. 6-12; BERRY, 1917, California Acad. Sci., Proc., ser. 4, vol. VII, no. 10, p. 241; DALL, 1921, p. 196 Carpenter; BERRY, 1922, California Acad. Sci. Proc., ser. 4, vol. XI, no. 18, p. 453, pl. III, figs. 13-15; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 199; 1927, vol. II, pt. III, p. 315; BURCH, 1947, no. 66, p. 19; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 206; BERRY, 1951, Mal. Soc. London, Proc., vol. 28, pt. 6, p. 214, 215, 221

The specific name should not be credited to Carpenter, as only Carpenter's manuscript name was utilized by Dall and by Pilsbry. Dall described the soft anatomy of the animal, and Pilsbry later (1892) described the shell. Dall, therefore, has priority of naming. Reference to the species is included here for the record in regard to names in connection with Carpenter's work.

Genus *Mopalia* Gray, 1847

*Mopalia* GRAY, 1847, Zool. Soc. London, Proc., p. 65, 69, 169

Type species by original designation, *Chiton Hindsii* REEVE, 1847, Conch. Icon., vol. 4, *Chiton*, pl. XII, fig. 67a-b. Recent. Alaska, to Gulf of California. PILSBRY, 1892, Man. Conch., vol. XIV, pl. 62, figs. 99, 100; pl. 63, fig. 57

*Mopalia acuta* (Carpenter)

(Pl. 31, fig. 18; Pl. 32, fig. 6)

*Chiton acutus* CARPENTER, 1855, Zool. Soc. London, Proc., p. 232; 1856, Zool. Soc. London, Proc., p. 221; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 198, 318; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 3; 1864b, p. 527, 648, Reprint, 1872, p. 13, 134

"*Chiton (Mopalia) lignosa* Gld. var. *acuta* Cpr.," DALL, in ORCUTT, 1886, U. S. Nat. Mus., Proc., vol. 8, p. 544

*Mopalia muscosa acuta* (Carpenter), PILSBRY, 1892, Man. Conch., vol. XIV, p. 297, pl. 64, figs. 75-79; DALL, 1921, p. 195; OLDROYD, 1927, vol. 11, pt. III, p. 306

*Mopalia muscosa plumosa* CARPENTER ms. in PILSBRY, 1892, Man. Conch., vol. XIV, p. 298, pl. 64, figs. 80, 81

*Mopalia muscosa fissa* CARPENTER ms. in PILSBRY, 1892, Man. Conch., vol. XIV, p. 299

*Mopalia acuta* (Carpenter), COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22; 1871, Amer. Jour. Conch., vol. VI, p. 59; BERRY, 1922, California Acad. Sci., Proc., ser. 4, vol. XI, p. 446, text fig. 9, pl. V, figs. 10-11; BURCH, 1947, no. 66, p. 19; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 206

A copy of the original description was published by Oldroyd (1927). The following should be changed in her copy:

Line 2: read "tenebrosioribus" for "tenebrosioibus."

Add:

"*Hab.* Sta. Barbara: olim legit T. Nuttall. Mus. suo.

"A very sharply angled, thin, delicately marked species, with extremely thin margin, and the edges of the valves deeply cut within." [Carpenter, 1855, p. 232]

"Subgeneric, aberrant form; with small blunt plate, instead of post. sinus, between the two principal lobes." [Carpenter 1864b, p. 648]

Three specimens illustrated by Pilsbry (1892) were considered by him as the types. He considered one specimen (pl. 64, figs. 76, 77) the "holotype" (Pilsbry, May 15, 1951, personal communication). They were collected by H. Hemphill at San Diego, California. However, the real holotype is in the British Museum. It is in the Nuttall Collection and bears a Nuttall label, "*Chiton incisus*. Sta. Barbara". There is also in Carpenter's handwriting the following note, "Comp. *acutus*. Cpr. Probably I found *incisus* preoccupied." (*Fide* G. L. Wilkins, Jan. 1, 1952, personal communication.) A photograph of the type was furnished by the British Museum

The type of *M. plumosa*, Carpenter in Pilsbry is in the Newcomb Collection (25530), Geology Department, Cornell University. The drawings made of that type for Carpenter were published by Pilsbry.

Pilsbry also included a description of *M. fissa* Carpenter ms. but did not illustrate the holotype, which he stated was from Monterey. Pilsbry regarded both *M. plumosa* and *M. fissa* as synonymous with *M. acuta* (Carpenter).

A specimen in the Redpath Museum is labelled by Carpenter, "*Mopalia filosa* Cpr. MS. type St. Barbara Cooper *plumosa* & *acuta*." This certainly is the "*M. fissa*" Carpenter ms. in Pilsbry. *M. filosa* Carpenter ms. is a *nomen nudum* and is either an error for *fissa*, or the *fissa* is an error for *filosa*. They equal the same and are regarded as equivalent to *M. acuta* Carpenter. The photo of "*M. filosa*" type is included to illustrate the character of *fissa*. Photographs of the type *A. filosa* Carpenter ms. were sent to Allyn Smith in 1945. Mr. Smith (Personal communication) wrote, "The species is undoubtedly what we are now calling *Mopalia acuta* (Carpenter), which Dall places as a subspecies of *M. muscosa* Gould, which I believe is not justified."

"*Mopalia filosa* Cpr. MS." is not the *Arthuria filosa* Carpenter ms. in Dall (1882, p. 287) and/or in Pilsbry (1892, p. 258).

*Dimensions*.—Long. 22.77 mm.; lat. 12.65 mm.; alt. 5.06 mm. (holotype); original dimensions of Carpenter converted into mm.

*Types*.—Holotype, British Museum (Natural History), 61.5.20.103, "*Chiton incisus*" Nuttall ms. = *C. acutus* Cpr.; holotype of *M. plumosa* Carpenter in Pilsbry, Geology Department, Cornell University, no. 25530; holotype of *M. "filosa"* Carpenter ms. = *M. fissa* Carpenter in Pilsbry, Redpath Museum, no. 9

*Distribution*.—Recent. San Diego, California (type); Santa Barbara to San Diego, California (Dall). Pleistocene. California (Berry)

#### *Mopalia imporcata* Carpenter

(Pl. 32, fig. 2)

*Mopalia imporcata* CARPENTER, 1864b, p. 603, 648 genus ?; Reprint, 1872, p. 89, 134; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 59; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22; PILSBRY, 1892, Man. Conch., vol. XIV, p. 301, pl. 62, fig. 98; 1896, Nautilus, vol. 10, no. 5, p. 49; DALL, 1921, p. 196; BERRY, 1917, California Acad. Sci., Proc., ser. 4, vol. VII, no. 10, p. 241; OLDROYD, 1927, vol. II, pt. III, p. 308; BURCH, 1947, no. 66, p. 19; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 206

*Placiphorella imporcata* (Carpenter), DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 306  
*Ostcochiton imporcatus* (Carpenter), DALL, 1887, U. S. Nat. Mus., Proc., 1886, vol. 9, p. 211

"Pale: central area ribbed: post. valve slightly notched. Indications of sutural pores in these two species, if confirmed, will require a new genus." [Carpenter, 1864b, p. 648]

"? *M. t. parva*, valde elevata, satis elongata; jugo acuto, rectangulato; pallida, rufotincta; areis lateralibus costa elevata, dense granulosa, definitis; suturis dense granosis, marginibus intus implicatis; valva antica circiter octies granoso-costata; arearum lateralium et valvae anticae interstitiis intricatim ruguloso-indentatis; areis centralibus costis longitudinalibus crebris, validissimis, acutis, subparallelis, interstitiis crenulato-decussatis; valva postica mucrone haud conspicuo, submarginali, sinu parvo, angusto: intus, sinu laminarum suturalium angusto: valvis centralibus fissura una; valva antica fissuris ?—; valva postica fissura utraque una, postice sinu parvo, angulato: limbo coriaceo, poris suturalibus aliisque luc et illuc sparsis, minutis, setulis albidis instructis.

"*Hab.*—In sinu Pugetiano specimina duo legit Kennerley.

"Ut in ? *M. sinuata*, à *Mopalia* typicis different." [Carpenter, 1865e, p. 59]

Pilsbry stated that his description and figures were drawn from Carpenter's type in the U. S. National Museum. There is also a specimen (plates separated) in the Carpenter Collection in the Redpath Museum on an original Carpenter glass mount with Carpenter's label. "*Placiphorella imporcata* Cpr type Puget Sd. Kennerley."

*Syntypes*.—U. S. National Museum, no. 4499; Redpath Museum, no. 57

*Distribution*.—Puget Sound, Washington (type); Forrester Island, Alaska, to San Pedro, California (Dall)

#### *Mopalia lignosa* (Gould)

(Pl. 27, fig. 12)

*Chiton lignosus* GOULD, 1846, July, Boston Soc. Nat. Hist., Proc., vol. II, p. 142 (see Otia, p. 100 for date); 1862, Otia Conch., p. 3

*Chiton merckii* MIDDENDORFF, 1847, April, Imp. Acad. Sci. St. Petersburg, Bull., vol. VI, p. 20, *vide* G. L. Wilkins

*Mopalia simpsonii* GRAY, 1847, May, Zool. Soc. London, Proc., p. 69

*Chiton montereyensis* CARPENTER, 1855, Zool. Soc. London, Proc., pt. XXIII, p. 231; 1856, Rept. British Assoc. Adv. Sci. 1855, p. 318, 349; 1860, Smith. Misc. Coll., vol. 2, art. 6, no. 1, p. 3; 1864b, p. 530, 554, 648, Reprint, 1872, p. 16, 40, 134 = *Mopalia lignosa* Gould in part; DALL, 1879, U. S. Nat. Mus., Proc., vol. 1, p. 304 under *Mopalia ciliata lignosa* Gould; PILSBRY, 1892, Man. Conch., vol. XIV, p. 300 under *Mopalia lignosa* Gould

Carpenter described *Chiton montereyensis* from a specimen in the Cuming Collection. Later (1864b), after examining perfect specimens of the same, he determined the form as equal to *Mopalia lignosa* (Gould). Authors have continued to agree with Carpenter in that assignment.

The type of *C. montereyensis* is in the British Museum. It is one of five specimens on a tablet which has a Cuming label. The original label reads: "*Montereyensis* Carp. =

simpsonii Grey Monterey." The front of the table has "Vancouver Is." as the locality (G. L. Wilkins, Sept. 7, 1951, personal communication).

"*Ct. ovata*, subelevata (ad angulum 120°), sublaevi; olivacea, valva utraque ad jugum rubro-fusco maculato, lineis tenebrosioribus valvis intermediis subradiantibus, valvis ultimis radiantibus; valvis intermediis lineis diagonalibus subdistinctis, ad marginem subquadratis, suturis conspicuis; areis lateralibus lineis paucis radiantibus obsoletis; tota superficie punctulis creberrimis conferta, subobsoletis, maxime ad areas laterales; mucrone vix prominente; limbo coriaceo, ad marginem et in suturis piloso, setis planatis curtis, incurvatis; intus valvarum marginibus haud valde arcuatis, sinu parvo, ad jugum subimpresso.

"Long. 2.4, lat. 1.42, alt. .45 poll.

"*Hab.* Monterey, rupibus ad undarum tumultum expositis: legit—Hartweg. Mus. Cuming.

"Margin with numerous but not crowded, short, incurved, horny, flattened hairs; shell very finely sculptured, dark olive, with very dark rays slightly diverging from the summit of each valve, and very conspicuous on the terminal one. The jugum is stained in each valve with sienna." [Carpenter, 1855, p. 231]

Through the courtesy of the authorities of the British Museum (Natural History) a photograph of the type of *C. montereyensis* Carpenter is included.

The synonymy of *M. lignosa* is not intended to be complete.

*Holotype*.—British Museum (Natural History), no. 1951. 9.7.1-5

*Distribution*.—Recent. Monterey, California (type of *M. montereyensis*). For complete distribution see that of *M. lignosa*. Pleistocene. (Berry; Chace and Chace)

#### Mopalia muscosa Gould

"*Chiton ornatus* Nutt. MS." Carpenter

*Mopalia muscosa* GOULD, 1846, July, Boston Soc. Nat. Hist., Proc., vol. II, p. 145; 1852, U. S. Expl. Exped., Moll., vol. XII, p. 313, Atlas (1856), pl. 28, fig. 436

*Chiton ornatus* Nutt. ms. CARPENTER, 1855, Zool. Soc. London, Proc. pt. XXIII, p. 232; 1856, Zool. Soc. London, Proc., pt. XXIV, p. 221; 1857, Rept. British Assoc. Adv. Sci. 1856, p. 198, 229, 318, 349; 1860, Smith. Misc. Coll., vol. 2, art. 6, p. 3; 1864b, p. 530; Reprint, 1872, p. 16; PILSBRY, 1892, Man. Conch., vol. XIV, p. 295 as *M. muscosa* Gould

Carpenter used Nuttall's manuscript name of *C. ornata* and described the San Diego shell, although he suspected that it might have been described by Gould. Carpenter (1864b) identified the Nuttall specimen as conspecific with *M. muscosa* Gould.

#### Mopalia muscosa kennerleyi Carpenter

*Mopalia grayii* CARPENTER, 1864b, p. 603, 648; Reprint, 1872, p. 89, 134 name preoccupied *vide* Carpenter

*Mopalia Kennerleyi* CARPENTER, 1864b, p. 648; Reprint 1872, p. 134 new name for *M. grayi* Carpenter, p. 603; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 59; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 21; 1871, Amer. Jour. Conch., vol. VI, p. 58

*Mopalia ciliata* Sowerby, PILSBRY, 1892, Man. Conch., vol. XIV, p. 303; BERRY, 1922, California Acad. Sci., Proc., vol. XI, no. 18, p. 449 in part

*Mopalia muscosa kennerleyi* Carpenter, DALL, 1921, p. 195 *kennerleyi*; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 197 *kennerleyi*; 1927, vol. II, pt. III, p. 306 *kennerleyi*; BURCH, 1927, no. 66, p. 19; LAROCQUE, 1953, Nat. Mus. Canada, Bull. 129, p. 15 *kennerleyi*

Oldroyd (1927) republished the original description, Carpenter's Latin description 1865, and a translation of the latter.

There are specimens with labels in the U. S. National Museum from Neah Bay and Vancouver Island, which bear Carpenter's initial, but none has a notation that it is type material.

*Holotype*.—Not found

*Distribution*.—Puget Sound, Washington (type); Shumagin Island, Alaska, to Monterey, California (Dall)

#### Mopalia sinuata Carpenter

(Pl. 33, figs. 6-13)

*Mopalia sinuata* CARPENTER, 1864b, p. 603, 648 genus?; Reprint, 1872, p. 89, 134; 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 59; COOPER, 1867, Geog. Cat. Moll., Geol. Sur.



California, p. 22; PILSBRY, 1892, *Man. Conch.*, vol. XIV, p. 303, pl. 62, figs. 95-97; BERRY, 1917, *California Acad. Sci., Proc.*, ser. 4, vol. VII, p. 241; DALL, 1921, p. 196; OLDROYD, 1927, vol. II, pt. III, p. 309; BURCH, 1947, no. 66, p. 19; SMITH AND GORDON, 1948, *California Acad. Sci., Proc.*, ser. 4, vol. XXVI, p. 206

*Mopalia (Placiphorella) sinuata* (Carpenter), DALL, 1879, U. S. National Museum, Proc., vol. I, p. 303, 306

*Osteochiton sinuata* (Carpenter), DALL, 1886, U. S. Nat. Mus., Proc. 1885, vol. 9, p. 211

*Mopalia* cf. *sinuata* Carpenter, BERRY, 1922, *California Acad. Sci., Proc.*, ser. 4, vol. XI, no. 18, p. 451, pl. VI, figs. 7-8 Pleistocene

"Small, raised sharp back, red and blue, engine—turned; post. valve deeply notched." [Carpenter, 1864b, p. 648]

"? *M. t. parva*, subelongata, elevata, jugo angulato; rubido et caeruleo elegantur maculata; valvis elongatis, subquadratis; areis lateralibus costa angusta, subelevata, granulosa, utraque definitis; suturis quoque granulosis; tota superficie clarissime reticulata, punctis areis centralibus valde, areis lateralibus et valvis terminalibus modice impressis; valvis terminalibus ut in areis lateralibus sculptis, costis acutis radiantibus, interstitiis reticulatis; valva postica maxime incisa, sinu alto, acuto mucronem tenus haud conspicuam effosa: intus rosacea; marginibus apicinis granulosis tota longitudine intortis; sinu laminarum saturalium parvo, angusto; laminis externis, valvis centralibus semel incisis; valva antica, fissuris circiter VIII., costis convenientibus; valva postica, fissura laterali utraque costae conveniente, postice maxime sinuata: limbo pallii coriaceo, pilulis paucis; poro rotundato parvo suturis utroque latere conveniente.

"*Hab.*—In sinu Pugetiano specimina duo legit Kennerley.

"*Mopaliis* typicus structura valvae posticae convenit: poris suturalibus vix definitis, differt." [Carpenter, 1865e, p. 59]

Pilsbry stated that his description and figures were drawn from the type in the U. S. National Museum. There is also a specimen in the Carpenter Collection in the Redpath Museum on Carpenter's original glass mount with Carpenter's label, "*Placiphorella sinuata* Cpr. type Puget Sd. Kennerley." That specimen, consisting of eight loose plates, is illustrated herein.

*Syntypes*.—U. S. National Museum, no. 4473; Redpath Museum, no. 58

*Distribution*.—Puget Sound, Washington (type); Forrester Island, to San Francisco, California (Dall)

#### *Mopalia swanii* Carpenter

*Mopalia (Kennerleyi, var.) Swanii* CARPENTER, 1864b (p. 627 *swanii*), p. 648; Reprint, 1872, p. 113, 134; 1864, *Ann. Mag. Nat. Hist.*, ser. 3, vol. XIV, p. 426; Reprint, 1872, p. 238 *swanii*; COOPER, 1867, *Geog. Cat. Moll.*, Geol. Sur. California, p. 21

*Mopalia ciliata* Sowerby, PILSBRY, 1892, *Man. Conch.*, vol. XIV, p. 304 in part

*Mopalia muscosa swanii* Carpenter, DALL, 1921, p. 195; OLDROYD, 1927, vol. II, pt. III, p. 306; BURCH, 1947, no. 66, p. 19

*Mopalia ciliata* (Sowerby, 1840), BERRY, 1922, *California Acad. Sci., Proc.*, ser. 4, vol. XI, no. 18, p. 449 in part

*Mopalia swanii* Carpenter, BERRY, 1951, *Mal. Soc. London, Proc.*, vol. 28, pt. 6, p. 214-217, 219, pl. 26, fig. 15

"red, ridge arched; less sculptured.<sup>140</sup> [Carpenter, 1864b, p. 648, *swanii*]

"*M. testa M. Kennerleyi* typicae similis, sed jugo fornicato, haud carinato; omnino rubida, sculptura multo minus expressa; areis lateralibus vix definitis; latera versus subgranulata; dorsum versus lineis jugum versus procedentibus, interstitiis punctatis; sinu postico latiore; limbo pallii lato; coriaceo, vix piluloso. Long. 2.4, lat. 1., div. 120°.

"*Hab.*—Tatooche Island (*Swan*)." [Carpenter, 1864d, p. 426, *swanii*]

Berry (1951) believed this to be a good species on the basis of a series of British Columbia specimens. He included a good illustration in his paper.

*Holotype*.—Not found

*Distribution*.—Tatooche Island, Washington (type); Shumagin Islands, Alaska, to Monterey, California (Dall)

<sup>140</sup> If this brief description is considered the original, the spelling of the specific name is spelled with one "n." This is closer to the collector's name, J. G. Swan. Since Dall (1921, reviser) the name has been spelled with one "n."

Genus *Dendrochiton* Berry, 1911

*Dendrochiton* BERRY, 1911, Acad. Nat. Sci. Philadelphia, Proc., vol. 63, p. 487

Type species by original designation *Mopalia (Dendrochiton) thamnopora* BERRY, 1911, Acad. Nat. Sci. Philadelphia, Proc., vol. 63, p. 487. Recent. Resurrection Bay, Alaska, to San Martin Island, California (Dall). BERRY, 1911, Acad. Nat. Sci. Philadelphia, Proc., vol. 63, p. 488, figs. 1-3

*Dendrochiton gothicus* (Carpenter)

(Pl. 32, fig. 3)

*Ischnochiton (Trachydermon) gothicus* CARPENTER, 1864b, p. 612; Reprint, 1872, p. 98, *nomen nudum*

*Trachydermon Gothicus* CARPENTER, 1864b, p. 649; Reprint, 1872, p. 135; 1866, California Acad. Sci., Proc., vol. III, p. 212; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 22

*Ischnochiton gothicus* Carpenter, PILSBRY, 1892, Man. Couch., vol. XIV, p. 74

*Trachydermon gothicus* Carpenter, PILSBRY, 1893, Man. Couch., vol. XV, p. 65, pl. 15, figs. 28, 29 type plates

? *Chaetopleura gothica* Carpenter, DALL, 1921, p. 193 *Dendrochiton*; OLDROYD, 1927, vol. II, pt. III, p. 290 section *Dendrochiton*

*Dendrochiton gothicus* (Carpenter), BERRY, 1919, California Acad. Sci., Proc., ser. 4, vol. IX, p. 3, 4, figs. 3, 4; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 206 doubts Monterey record

*Mopalia (Dendrochiton) gothica* (Carpenter), BURCH, 1947, no. 66, p. 19

"Blunt parallel riblets along very arched back. Sutural lobes united in sinus: eaves not spongy. 8-20 fm. *Cp.*" [Carpenter, 1864b, p. 649]

". . . State Collection, 518a.

"Tr. t. parva valde elevata, viridi, rosaceo et olivaceo eleganter tincta; valvis gothice arcuatis, jugo acuto; areis lateralibus parvis, arcuatim distincte definitis, granulosis; umbonibus prominentibus; marginibus umbonalibus colore tessellatis, intortis; areis centralibus longitudinaliter costatis, costis rotundatis, crebris, haud valde expressis, interstitiis parvis, vix interdum decussatis; valv. term. ut in ar. lat. sculptis, postica mucrone mediano, subelevato: intus, lobis suturalibus haud separatis, medio latissime sinuatis; laminis insertionis, lat. infissatis, term. VIII-X.—fissatis, obtusis, subgrundis haud elevatis: limbo pallii minutissime squamuloso, granulosis confertissimus, subrotundatis, laevibus; circa marginem pilulis suberectis.

"Long. 0.20, lat. 0.10; div. 80°.

"*Hab.* Catalina Island, 8-20 fm., *Cooper.*" [Carpenter, 1866a, p. 212]

A set of types is in the U. S. National Museum, and one is in the Redpath Museum. Both suites are on the original glass mounts of Carpenter with Carpenter's original label. There are five specimens at McGill labelled, "type Catalina Is. St. Barbara Is. Cooper." The specimen in the U. S. National Museum consists of four small plates with a label, "Catalina Id. Cooper type." The photograph of one of the types at McGill is included. It may be verified readily with the original drawings of plates by Carpenter in Pilsbry pl. 15, figs. 28, 29).

Berry (1919) pointed out distinguishing features of this species which was then little known.

Oldroyd republished Pilsbry's translation of Carpenter's Latin description.

*Syntypes*.—U. S. National Museum, no. 16271, 4 separate plates; Redpath Museum, no. 13

*Distribution*.—Recent. Catalina Island, California (type): Monterey to Catalina Island (Dall)

Genus *Basiliochiton* Berry, 1918

*Basiliochiton* BERRY, 1918, Nautilus, vol. 32, No. 1, p. 12

Type species by original designation *Mopalia heathii* PILSBRY, 1898, Acad. Nat. Sci. Philadelphia, Proc., vol. 50, p. 288. Living. Pacific Grove, California. BERRY, 1925, Acad. Nat. Sci. Philadelphia, Proc., vol. 77, p. 25, figs. 1, 2 (holotype). (pl. 33, fig. 14, holotype)

*Trachydermon* Carpenter was first mentioned (1864b, p. 612) with two species *Ischnochiton (Trachydermon) pseudodontiens* Carpenter [= *Cyanoplax dentiens* (Gould)] and *I. (T.) gothicus* Carpenter, "n.s."

*T. gothicus* Carpenter was at the time a manuscript name and, therefore, not eligible to be type species of the genus. *I. pseudodentiens* Carpenter was a name given by Carpenter for *Chiton dentiens* Gould (1846). Hence *Chiton dentiens* Gould is the monotype of *Trachydermon*. *Chiton dentiens* Gould is a *Cyanoplax* Pilsbry, 1892 (*vide* Berry, 1948b, p. 14), which makes *Trachydermon* Carpenter have precedent over the later generic name.

In Carpenter's second mention of *Trachydermon* (1864b, p. 649) he included nine species in the genus. It is this second reference which Pilsbry (1892, p. 67; 1893, p. 62, 63) considered the original reference. Pilsbry designated the last species mentioned, *T. flectens* Carpenter, as the type species of the genus.

Dall (1879, p. 295) used *Trachydermon* Carpenter with "*T. cinereus* Lowe" as type species. That designation is not valid, because that species was not included by Carpenter in the original mention of the genus.

Berry (1918) proposed the name *Basiliochiton* for *T. flectens* Carpenter, because he had been told that *Trachydermon* was preoccupied. However, although there are several uses of *Trachyderma* (Latreille, 1829; Gravenhorst, 1829; Wiegman, 1834) the appellation of *Trachydermon* has not been used other than that of Carpenter. *Basiliochiton* is not necessary or valid unless the first reference of Carpenter is accepted, whereby *Trachydermon*, 1864, has precedent over *Cyanoplax* Pilsbry, 1892. If this condition is not accepted, *Trachydermon* is a bona fide generic name, and *T. flectens* Carpenter is the type species.

Prof. Henry Poirier was consulted in regard to the equivalence of *Trachyderma* and *Trachydermon* because of similar classical origin. Professor Poirier kindly sent his opinion (Oct. 6, 1955, personal communication) as follows:

"They (*Trachyderma* and *Trachydermon*) differ only in termination, but *Trachydermon* introduced in 1863 should not now be rejected because it has the same origin and meaning as *Trachyderma*."

#### "*Basiliochiton*" *flectens* (Carpenter)

*Ischnochiton flectens* CARPENTER, 1864b, p. 603, 606; Reprint, 1872, p. 89, 92; PILSBRY, 1892, Man. Conch., vol. XIV, p. 75

*Trachydermon flectens* CARPENTER, 1864b, p. 649; Reprint, 1872, p. 135; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 23; 1871, Amer. Jour. Conch., vol. VI, p. 59; PILSBRY, 1893, Man. Conch., vol. XV, p. 64, pl. 15, figs. 34-37; BERRY, 1917, California Acad. Sci., Proc., vol. VII, no. 10, p. 239, 245-248

*Ismochiton (Trachydermon) flectens* CARPENTER, 1865, Acad. Nat. Sci. Philadelphia, Proc., vol. 17, p. 60

*Lepidochitona flectens* (Carpenter), DALL, 1918, Nautilus, vol. 32, p. 3; 1921, p. 189 section *Basiliochiton*; OLDROYD, 1924, Pub. Puget Sound Biol. Station, vol. 4, p. 187; 1927, vol. II, pt. III, p. 260 section *Lepidochitona*; WILLETT, 1935, Nautilus, vol. 49, no. 2, p. 42 includes *Dendrochiton semiliratus* BERRY, 1927, as synonymous

*Basiliochiton flectens* (Carpenter), BERRY, 1918, Nautilus, vol. 32, p. 12; 1925, Acad. Nat. Sci. Philadelphia, Proc., vol. 77, p. 23, 24; BURCH, 1947, no. 66, p. 19; SMITH AND GORDON, 1948, California Acad. Sci., Proc., ser. 4, vol. XXVI, p. 206

"Mantle-margin scarcely granular. Rosy, very small, scarcely sculptured: valves beaked and waved as in *M. Simpsonii*: eaves and incisors normal." [Carpenter, 1864b, p. 649]

Oldroyd (1927) republished Carpenter's Latin description (1866) and Pilsbry's translation.

To Oldroyd's copy of Carpenter's description (1865e) the following lines should be added:

"*Hab.* In sinu Pugetiano legit Kennerley: in insulâ Vancouver legit Lord: prope Monterey, Taylor: apud San Diegonem, Cooper." [Carpenter, 1865e, p. 60]

The type of this species has not been found. The statement in Oldroyd (1927) that it is in the U. S. National Museum and her statement regarding type locality are incorrect. The type locality could be one of three locales (see description above), depending on where a syntype may be found. Berry's (1925, p. 24) statement that Puget Sound is the type locality will only prove to be true if a type is eventually found or selected from that area.

There are two lots of specimens (not types) in the U. S. National Museum which bear the name "*L. flectens montereyensis* Cpr." This is a *nomen nudum*. Berry (1917, p. 247)

referred to the nude name, "*Trachydermon flectens montereyensis* Bartsch," which had appeared in print but never been described. Berry referred the latter to *Mopalia hcaithii* Pilsbry in Berry (1911, p. 490, figs. 4-7, pl. XI, figs. 1-3, 7)

Family ACANTHOCHITONIDAE  
Genus **Acanthochitona** Gray, 1821

*Acanthochitona* GRAY, 1821, London Medical Repository, p. 234

Type species by monotypy *Chiton fascicularis* LINNAEUS, 1767, Syst. Nat., XII ed., p. 110c. Living. Northern Europe, south through Mediterranean. PILSBRY, 1893, Man. Conch., vol. XV, pl. 4, figs. 77, 78, 79

**Acanthochitona avicula** (Carpenter)  
(Pl. 32, fig. 4)

*Acanthochites avicula* CARPENTER, 1864b, p. 612, 650; Reprint, 1872, p. 98, 136; 1866a, California Acad. Sci., Proc., vol. III, p. 211; COOPER, 1867, Geog. Cat. Moll., Geol. Sur. California, p. 23; PILSBRY, 1893, Man. Conch., vol. XV, p. 24, *Acanthochitona avicula* (Carpenter), DALL, 1921, p. 197; BERRY, 1922, California Acad. Sci., Proc., ser. 4, vol. XI, no. 18, p. 456, pl. VI, fig. 9; OLDROYD, 1927, vol. II, pt. III, p. 318; BURCH, 1947, no. 66, p. 19; SMITH AND GORDON, 1948, California Acad. Sci., Proc., vol. III, p. 206

"Like *aragonites*, but valves sculptured in large snake-skin pattern. 8-20 fm. r. *Cp.*" [Carpenter, 1864b, p. 650]

Oldroyd (1927) republished the Latin description (1866a) and Pilsbry (1893) presented a translation of the description which was also copied by Oldroyd. The following lines should be added to make that copy complete:

"... State Collection, no. 1072

"*Hab.* Catalina Island, 10-20 fm., rare; *Cooper.*" [Carpenter, 1866a, p. 211]

The holotype of this species is in the Redpath Museum, labelled by Carpenter, "type Catalina Is. Cp. 1072." This label corresponds with Carpenter's (1866a) description.

*Holotype.*—Redpath Museum, no. 72

*Distribution.*—Recent. Catalina Island, California (type); Catalina Island, to Gulf of California (Dall). Pleistocene. California (Berry)

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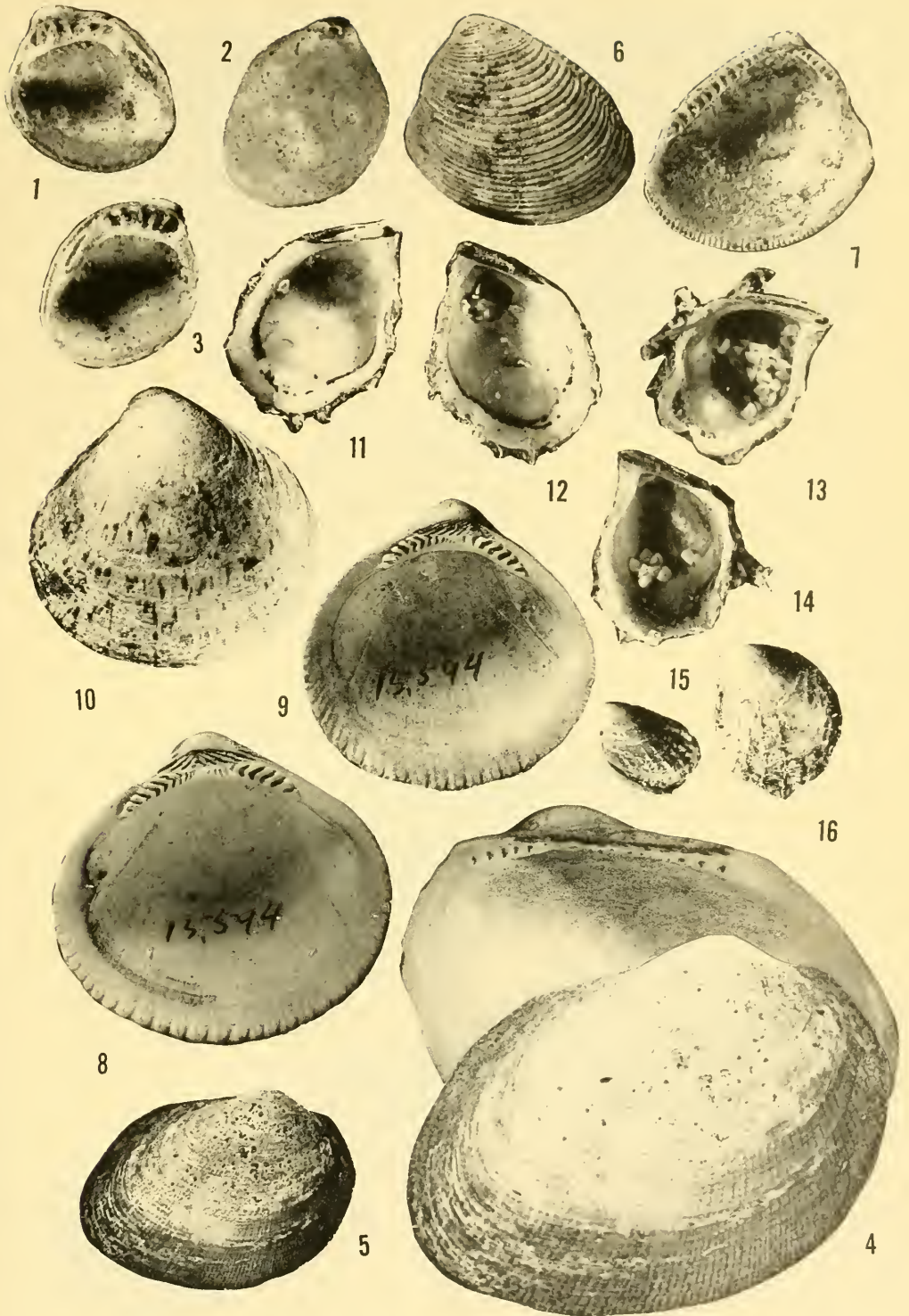
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EXPLANATION OF PLATES

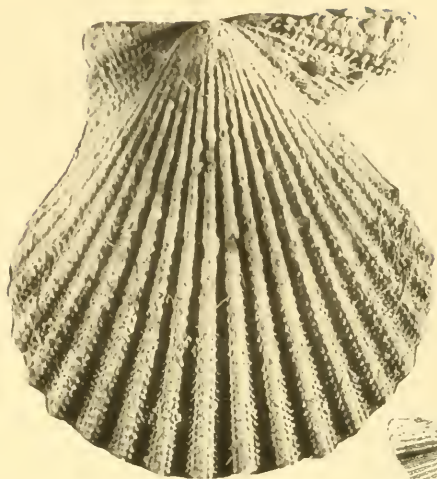


PLATE 1.—*HUXLEYIA*, *BARBATIA*, *NUCULA*, *GLYCYMERIS*, AND *PHILOBRYA*

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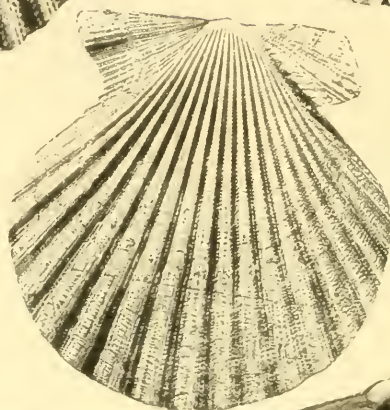
*HUXLEYIA, BARBATIA, NUCULA, GLYCYMERIS, AND PHILOBRYA*



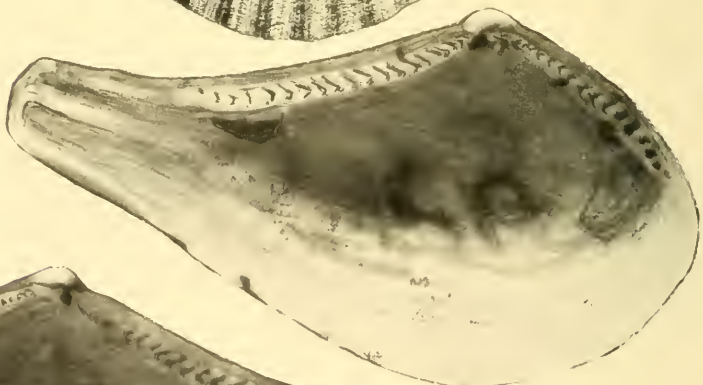
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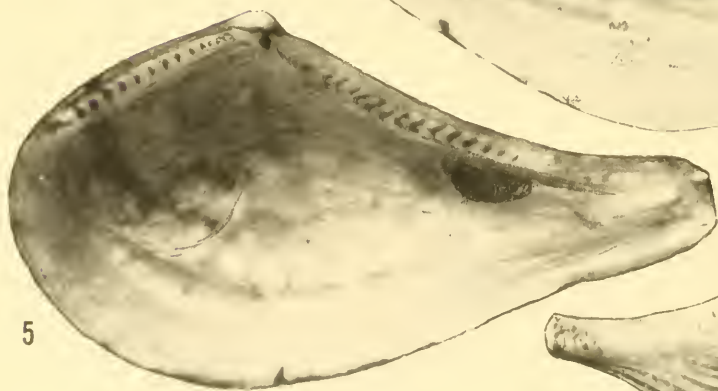
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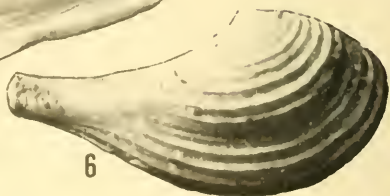
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6

PECTEN AND NUCULANA

## PLATE 2.—PECTEN AND NUCULANA

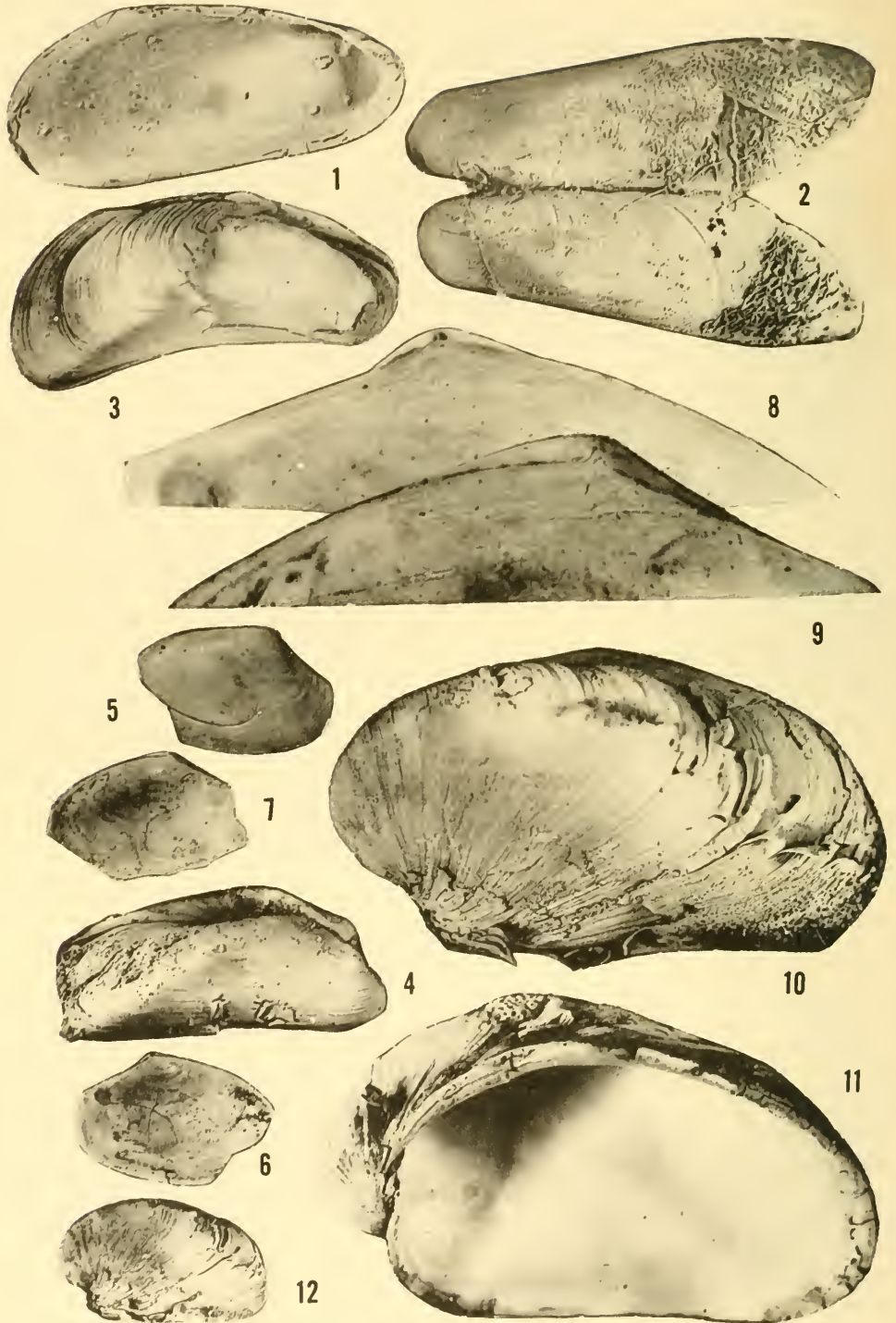
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*MODIOLUS, ADULA, AND ASTHENOTHAERUS*

PLATE 4.—*MODIOLUS*, *ADULA*, AND *ASTHENOThAERUS*

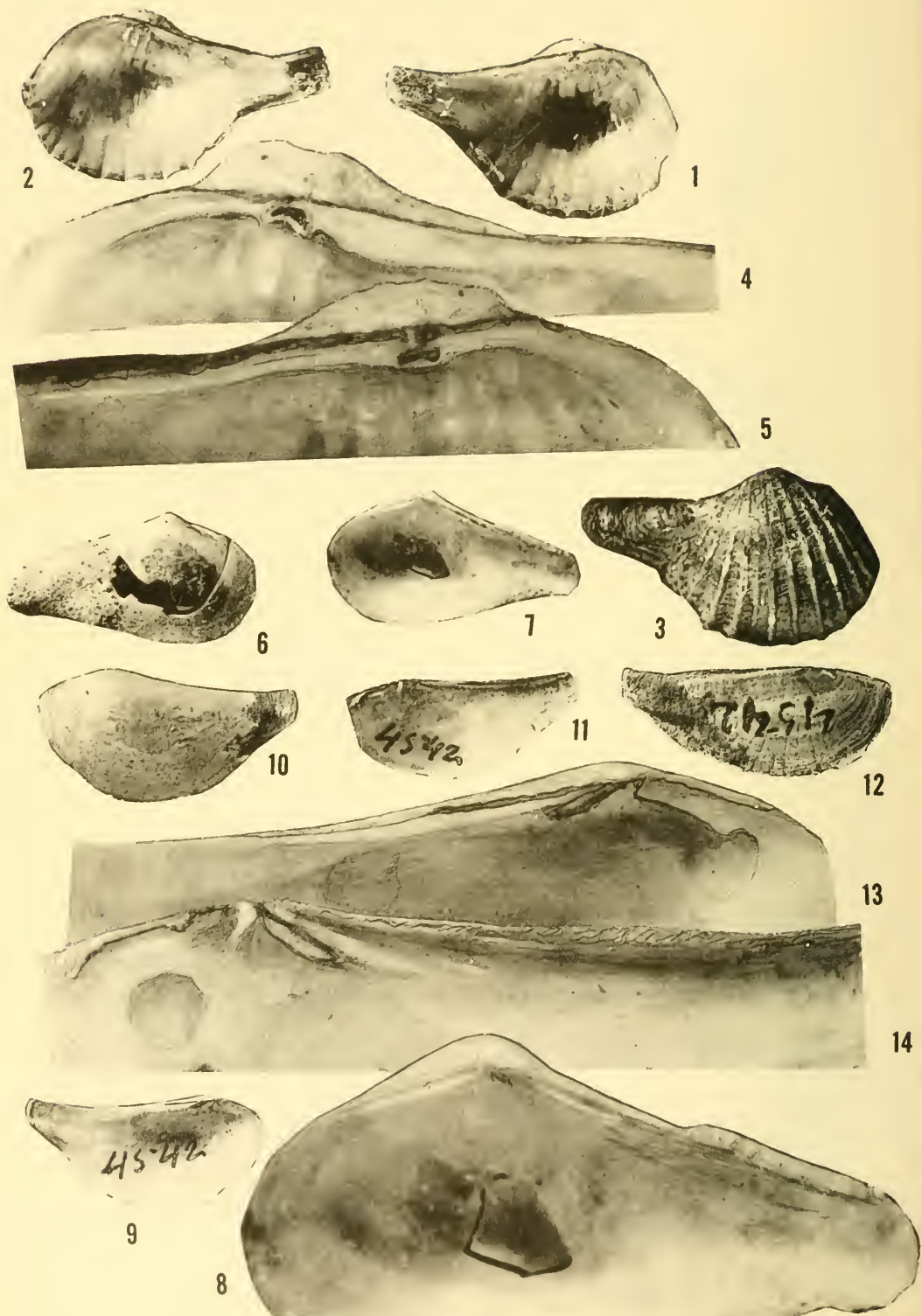
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PANDORA AND OSTREA



CUSPIDARIA, LEIOMYA, AND PANDORA

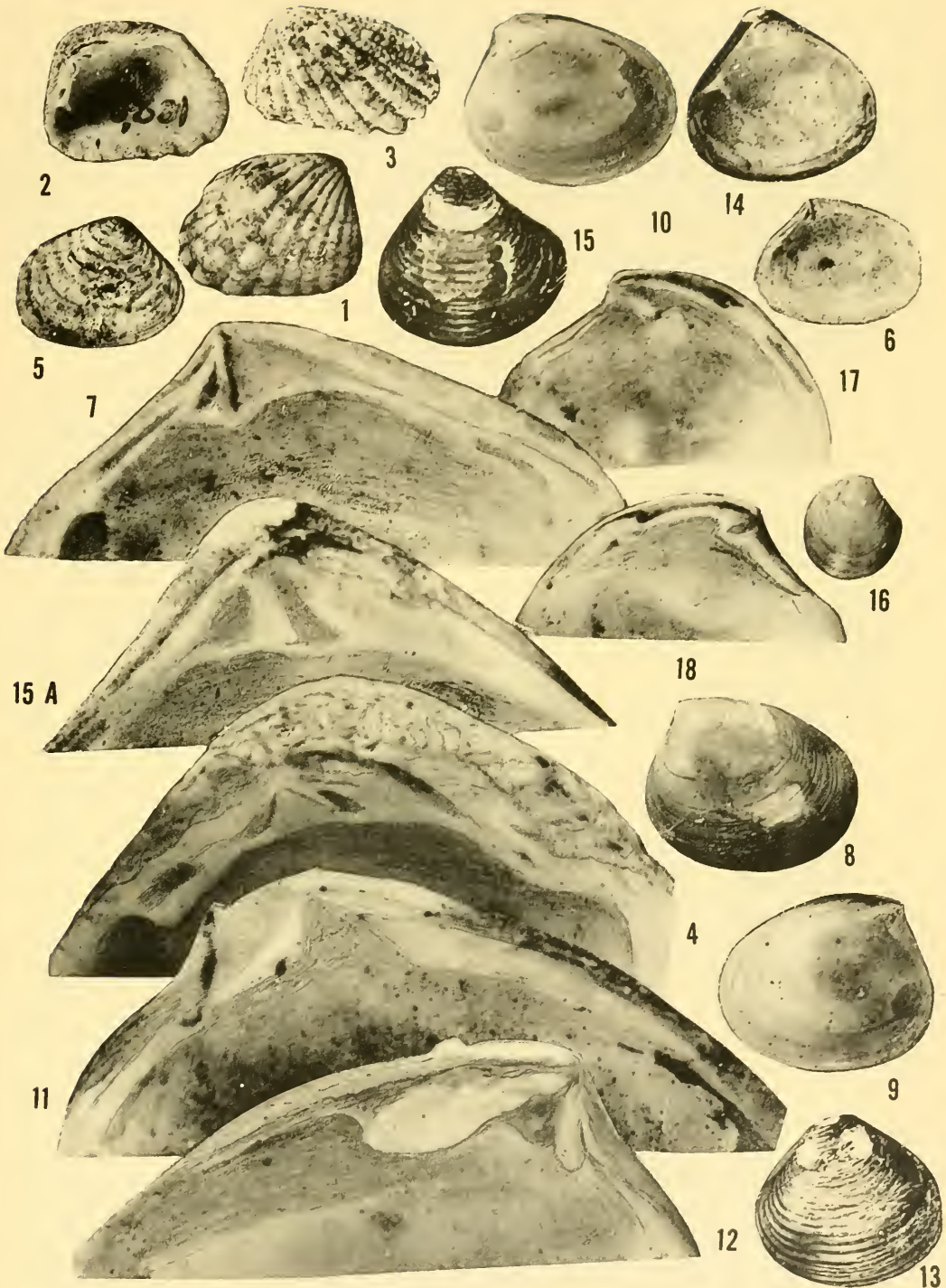
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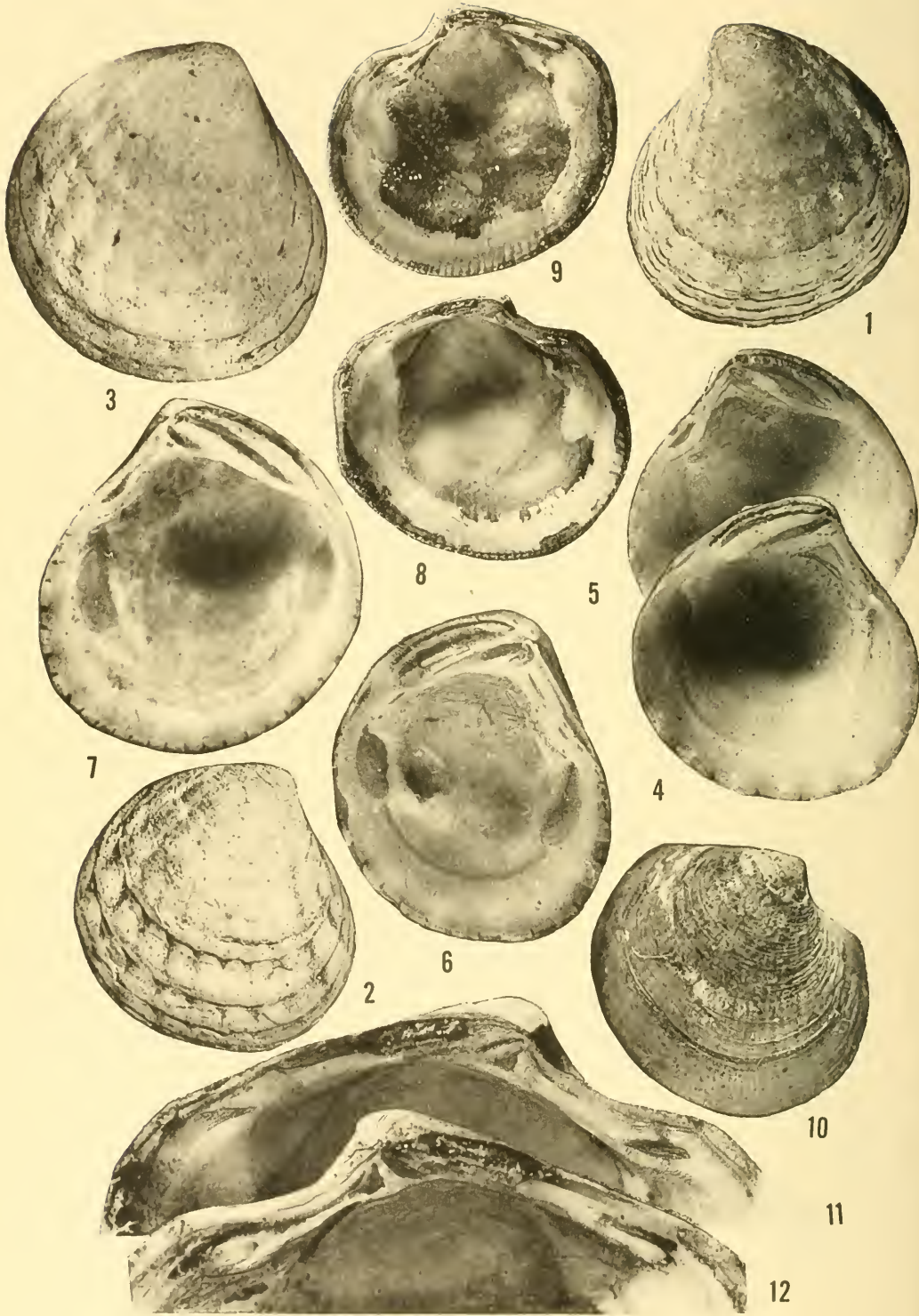
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*GLANS, EUCRASSATELLA, MYSELLA, ASTARTE, AND AXINOPSIDA*



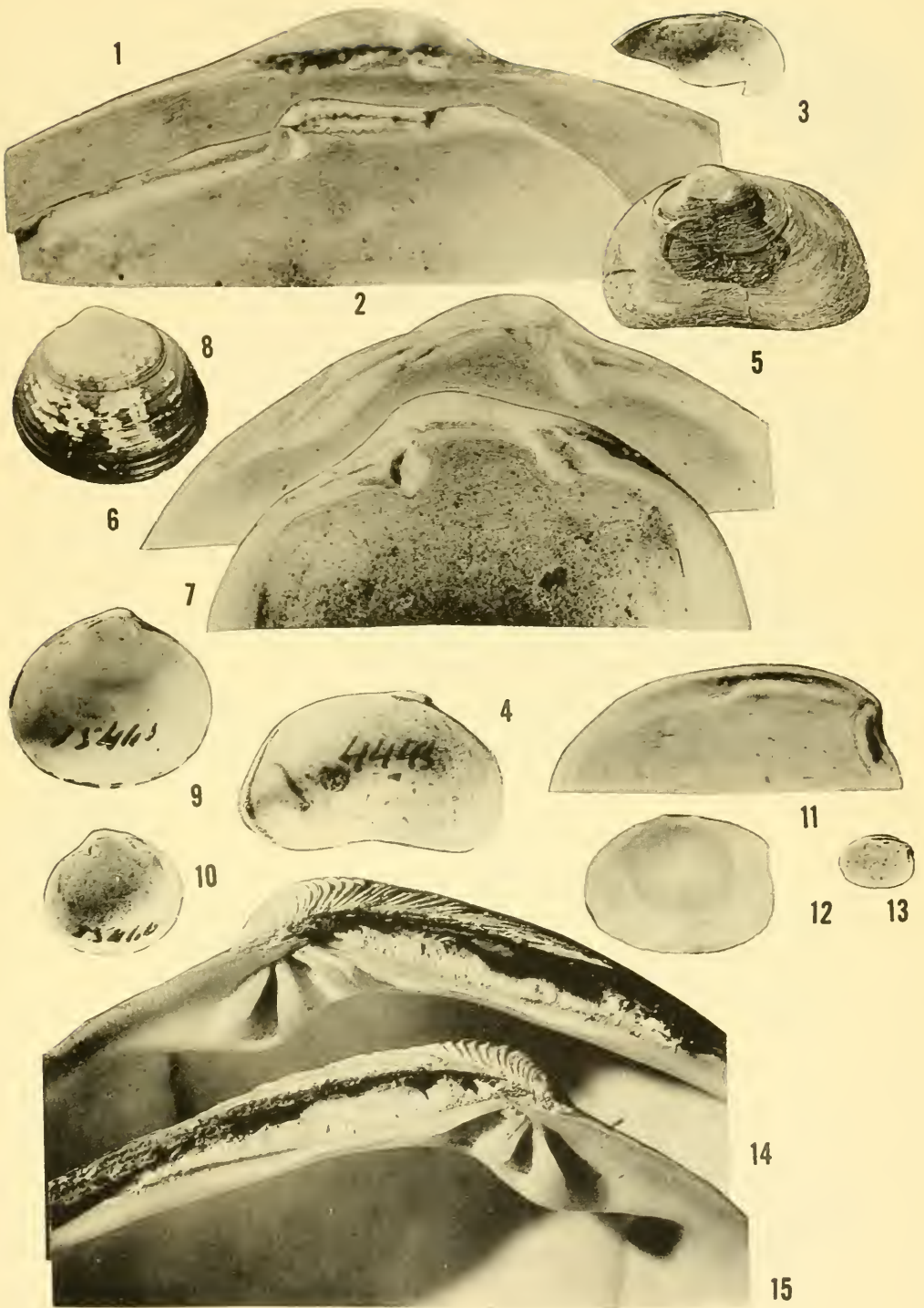
MIODONTISCUS AND LUCINA

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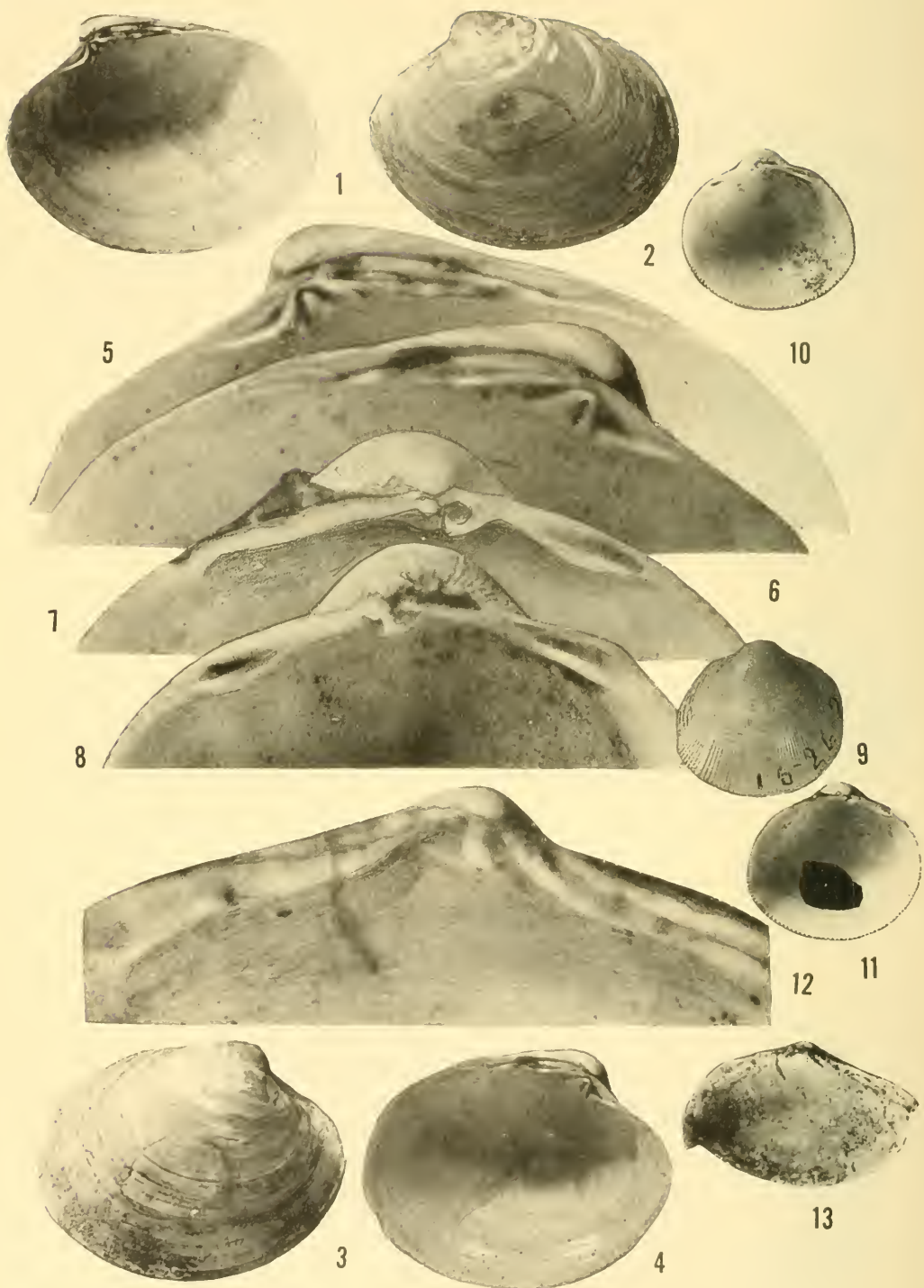
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PSEUDOPYTHINA, KELLIA, PRISTES, AND HUMILARIA



COMPSOMYAX, NEMOCARDIUM, AND LEPTON

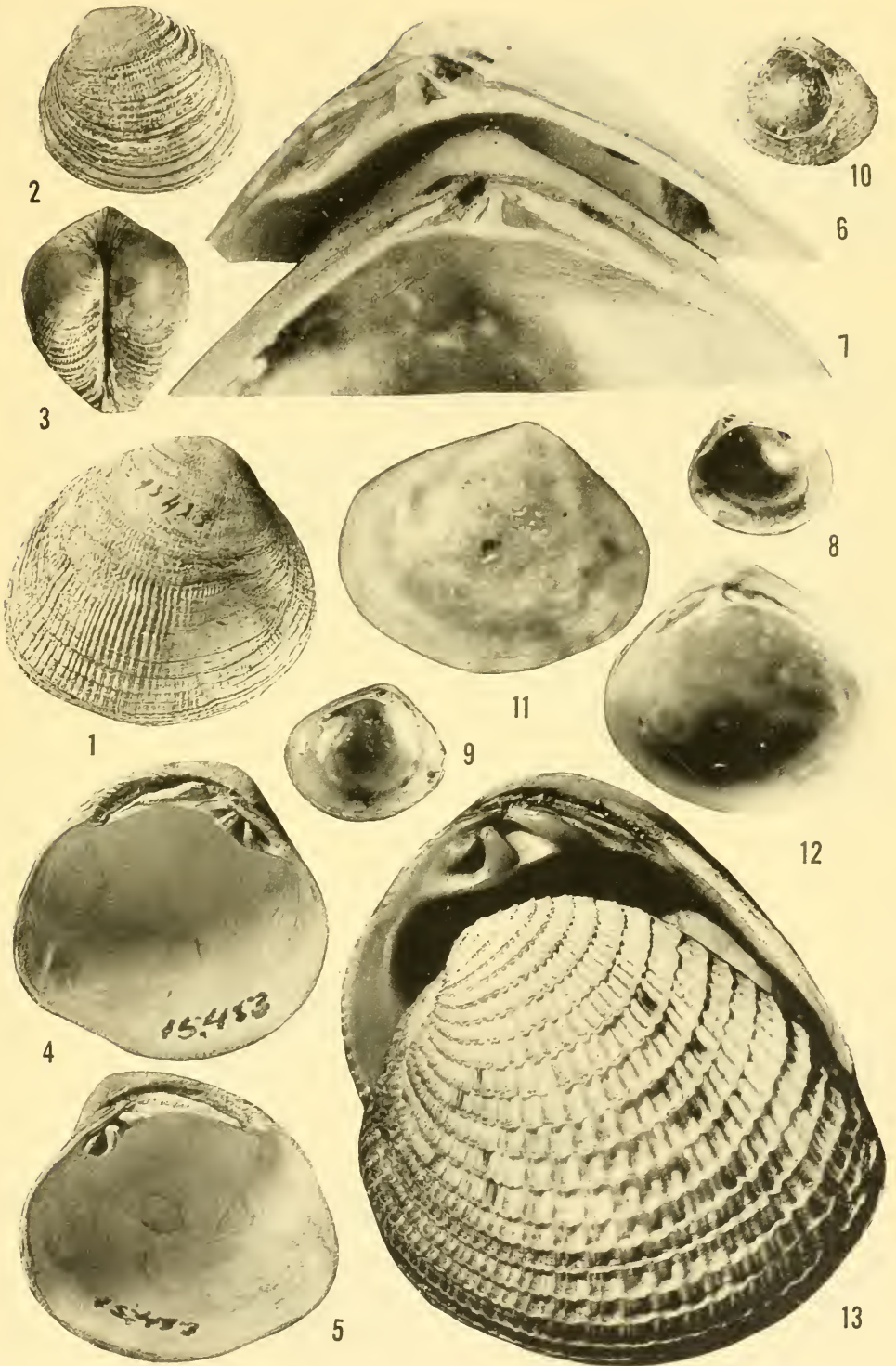
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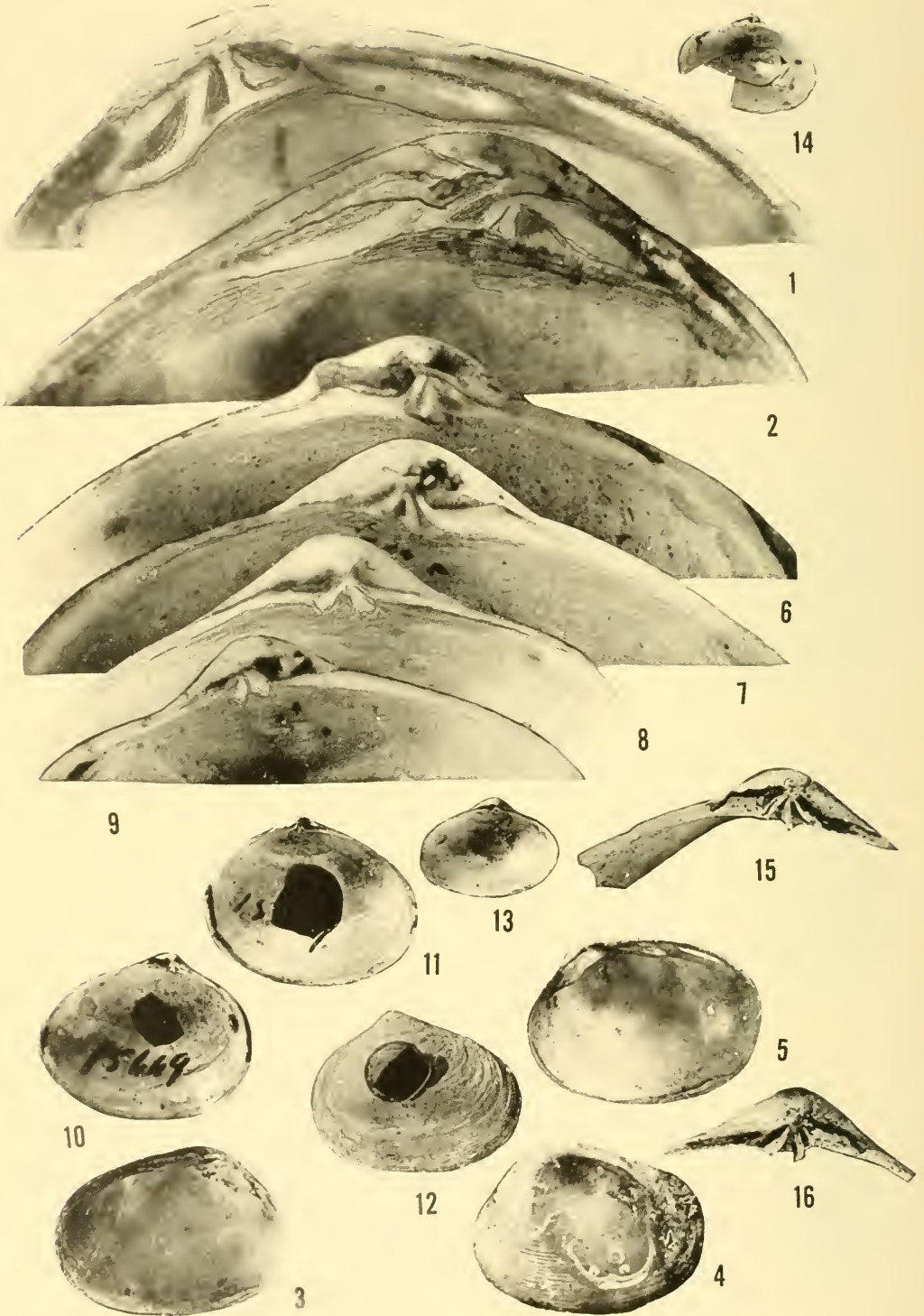
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PROTHACA, PSEPHIDIA, AND CHIONE



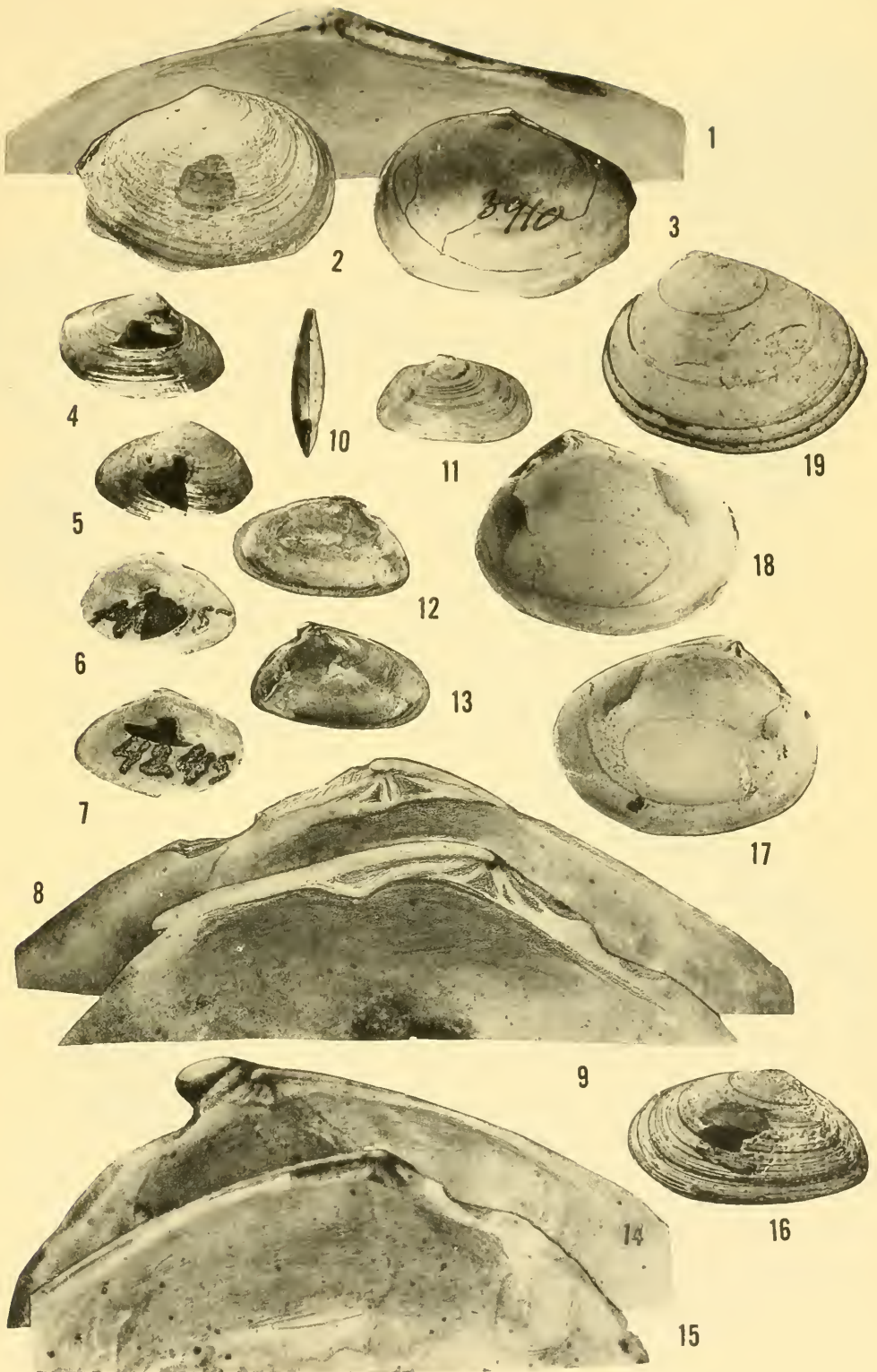
PETRICOLA AND COOPERELLA

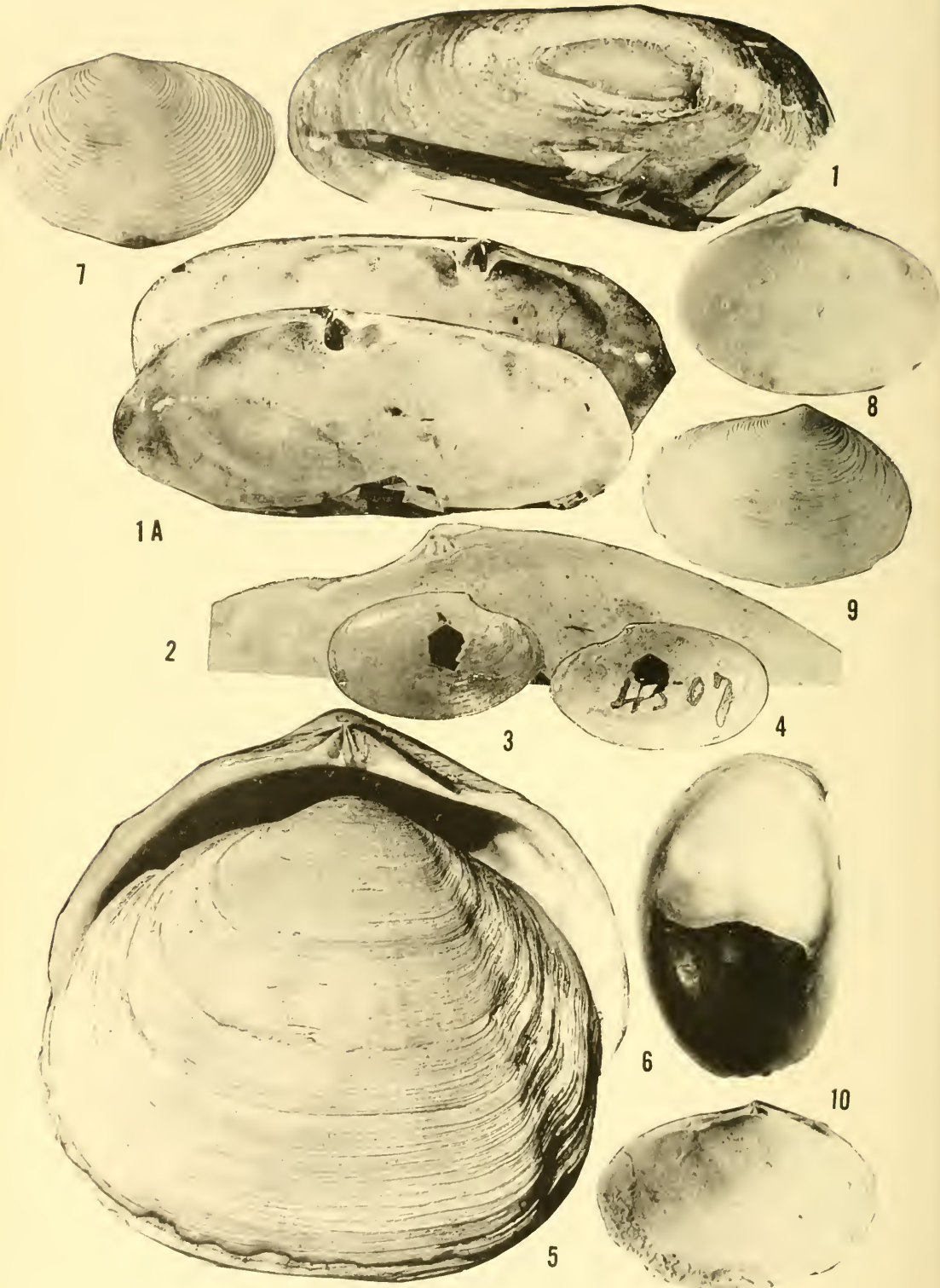
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DARINA, MACOMA, APOLYMETIS, CREPIDULA, AND SEMELE

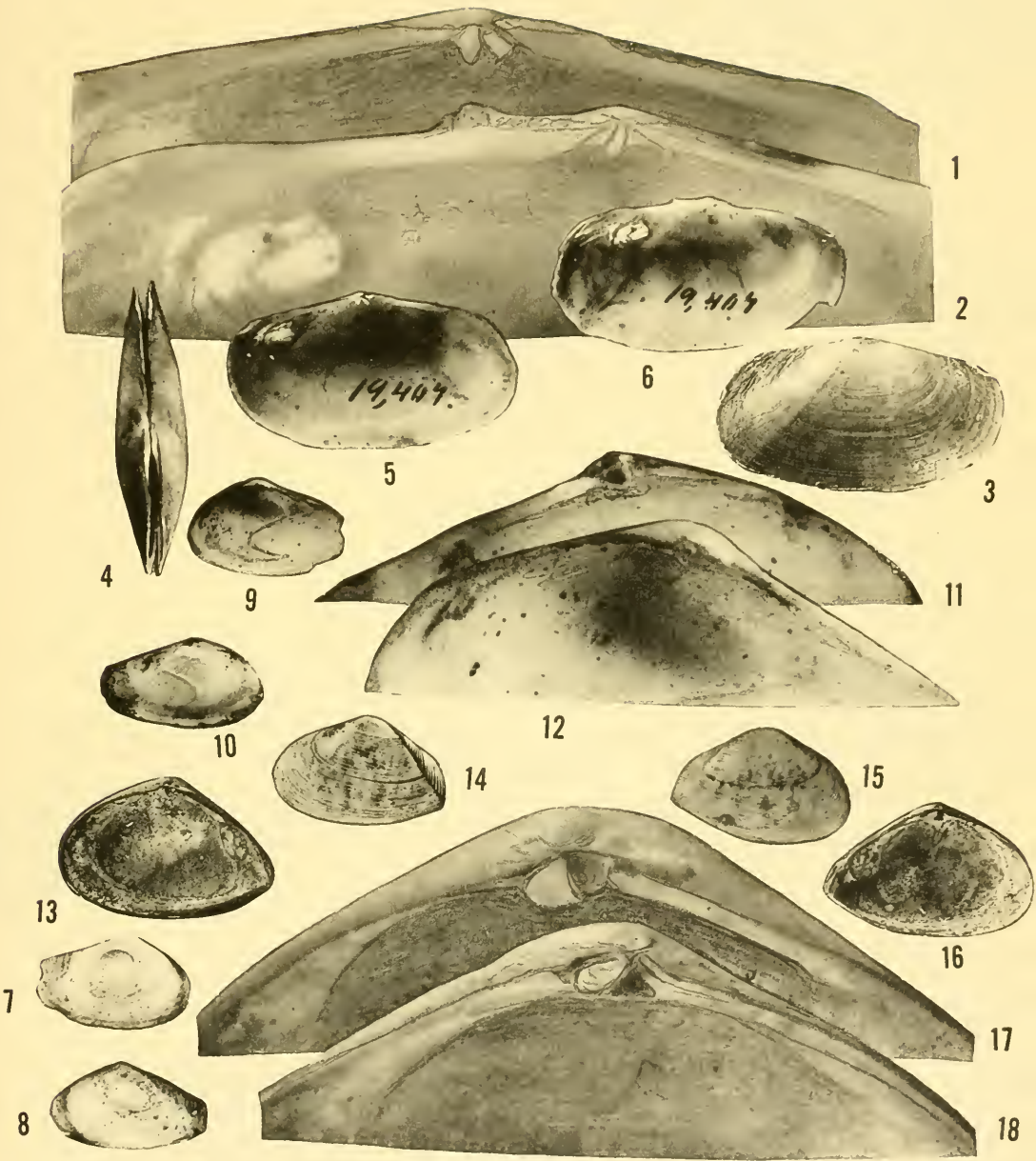
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Holotype, British Mus. (Nat. Hist.), 61.5.20.117. Photo Crown copyright reserve, neg. 6170. "Santa Barbara N. Calif.;" × 2.	
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Specimen, Univ. California, No. 33453. Figs. 7, 10, right valve, length, 14.25+ mm.; height, 10+ mm.; Figs. 8, 9, left valve, length, 14 mm.; height, 9+ mm.	

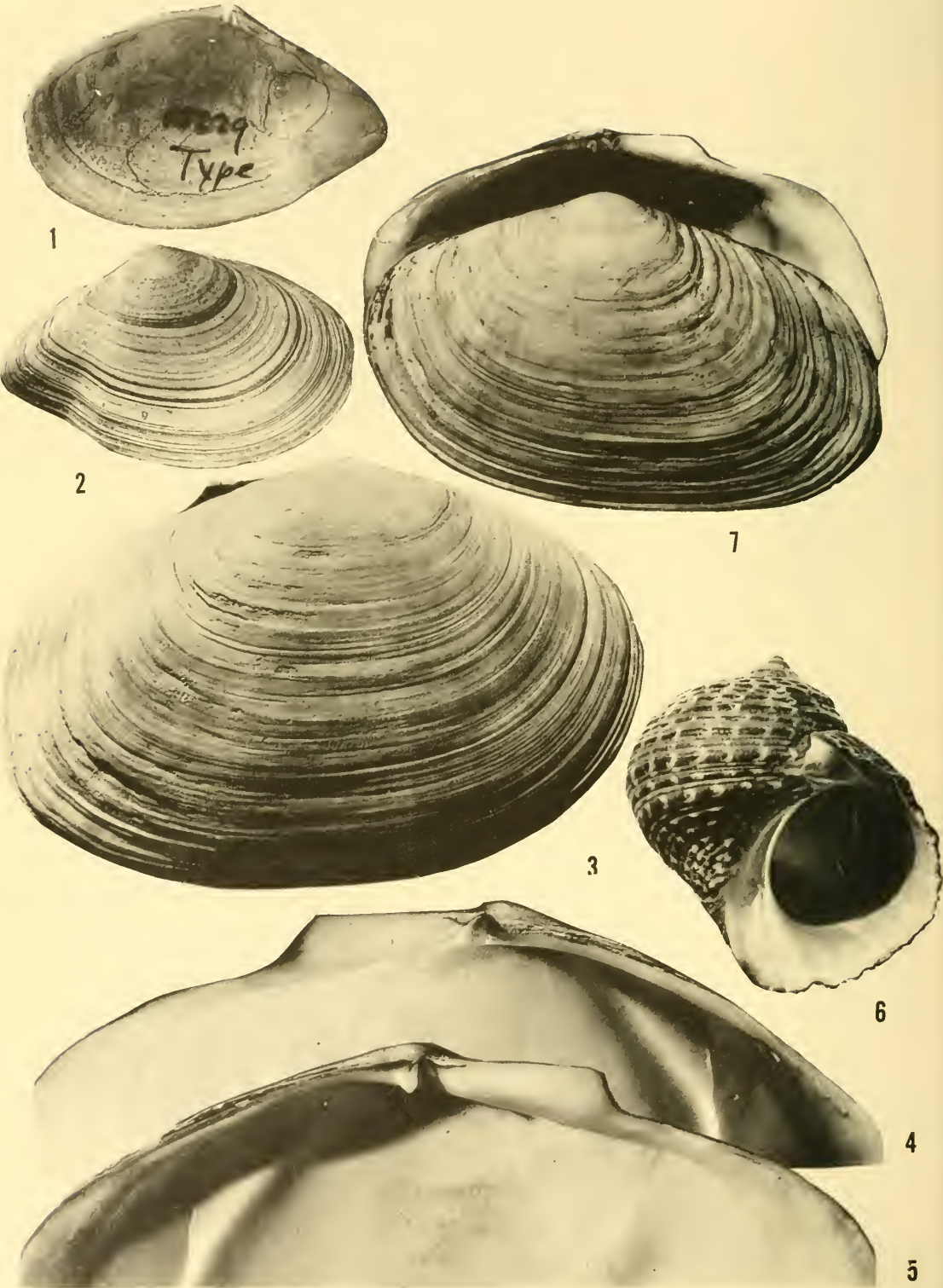
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GARI, SPHENIA, AND CORBULA



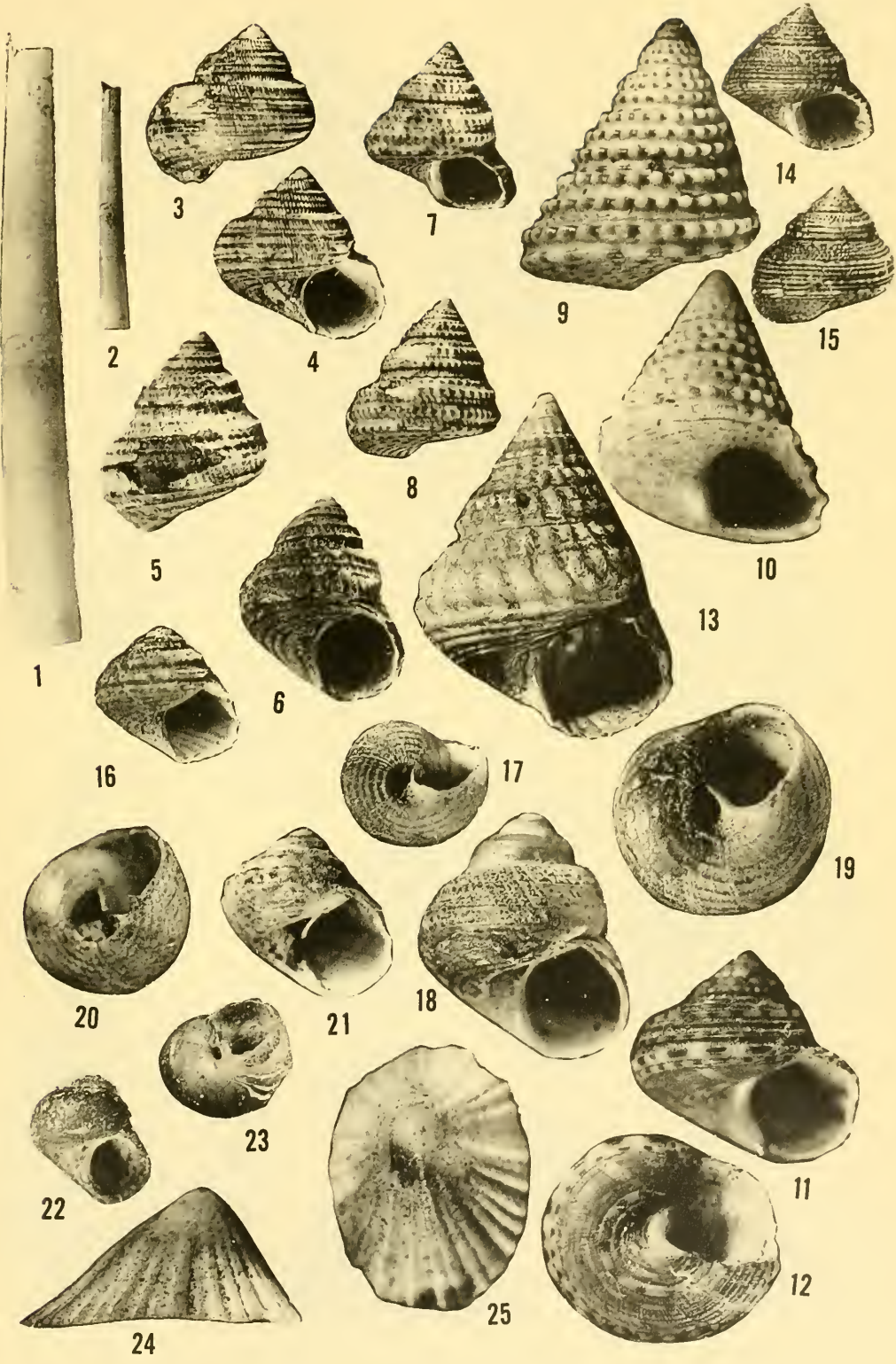
*MACOMA, PSAMMOBIA, CALLOPOMA, AND GARI*

PLATE 16.—*MACOMA*, *PSAMMOBIA*, *CALLOPOMA*, AND *GARI*

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"California (Neiah Bay)." Mus. Cuming. British Mus. (Nat. Hist.), 1950.8.24.1; × 2. Photo Crown copyright reserve, neg. 4695.	
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6. <i>Callopoma fluctosus</i> (Wood) .....	148
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*CIDARINA* AND *ACMAEA*

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DENTALIUM, SOLARIELLA, MARGARITES, CALLIOSTOMA, CIDARINA, AND ACMAEA



LITTORINA, LACUNA, PHASIANELLA, MARGARITES, ACMAEA, LEPETA. PUNCTURELLA, AND FISSURELLA

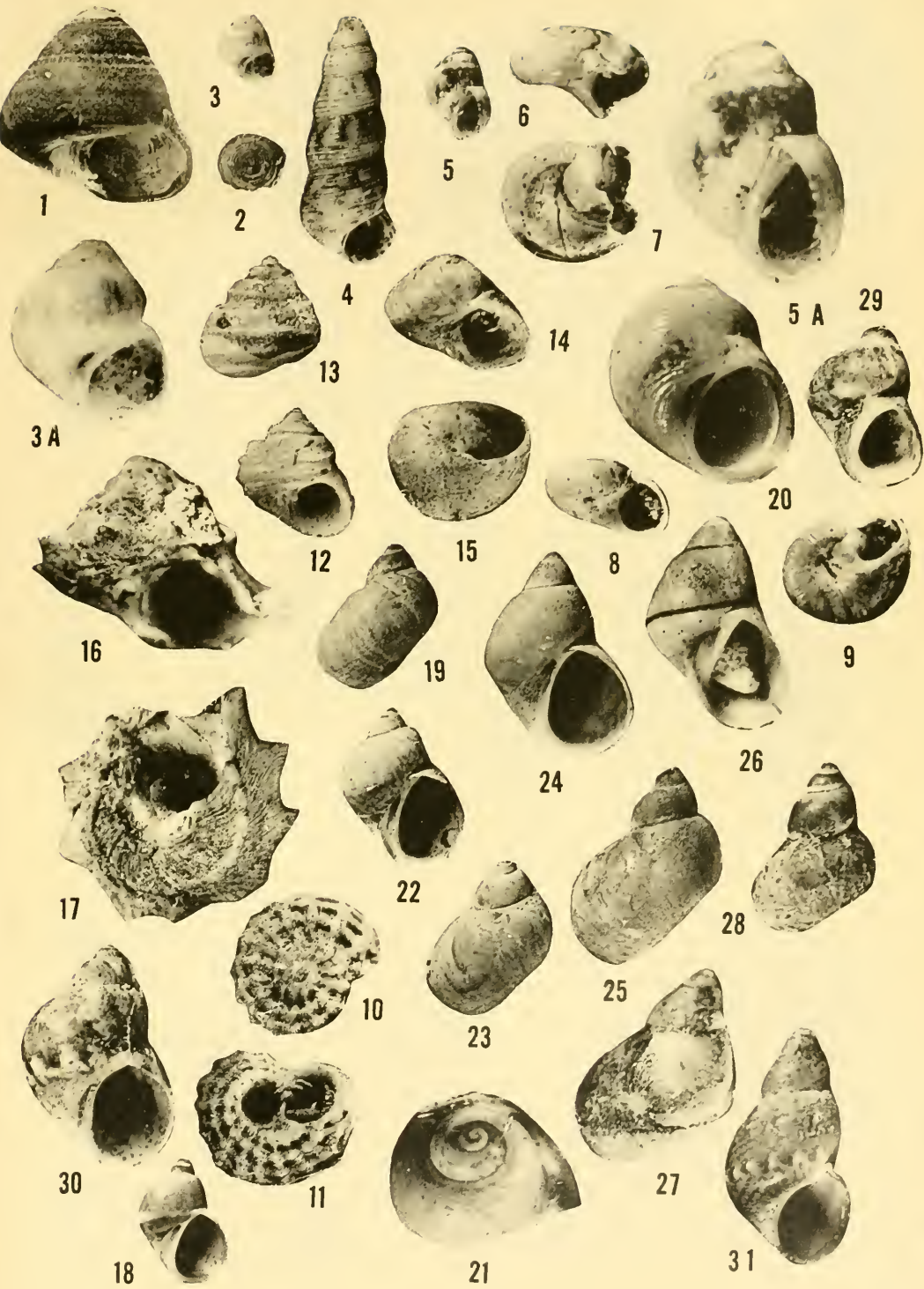
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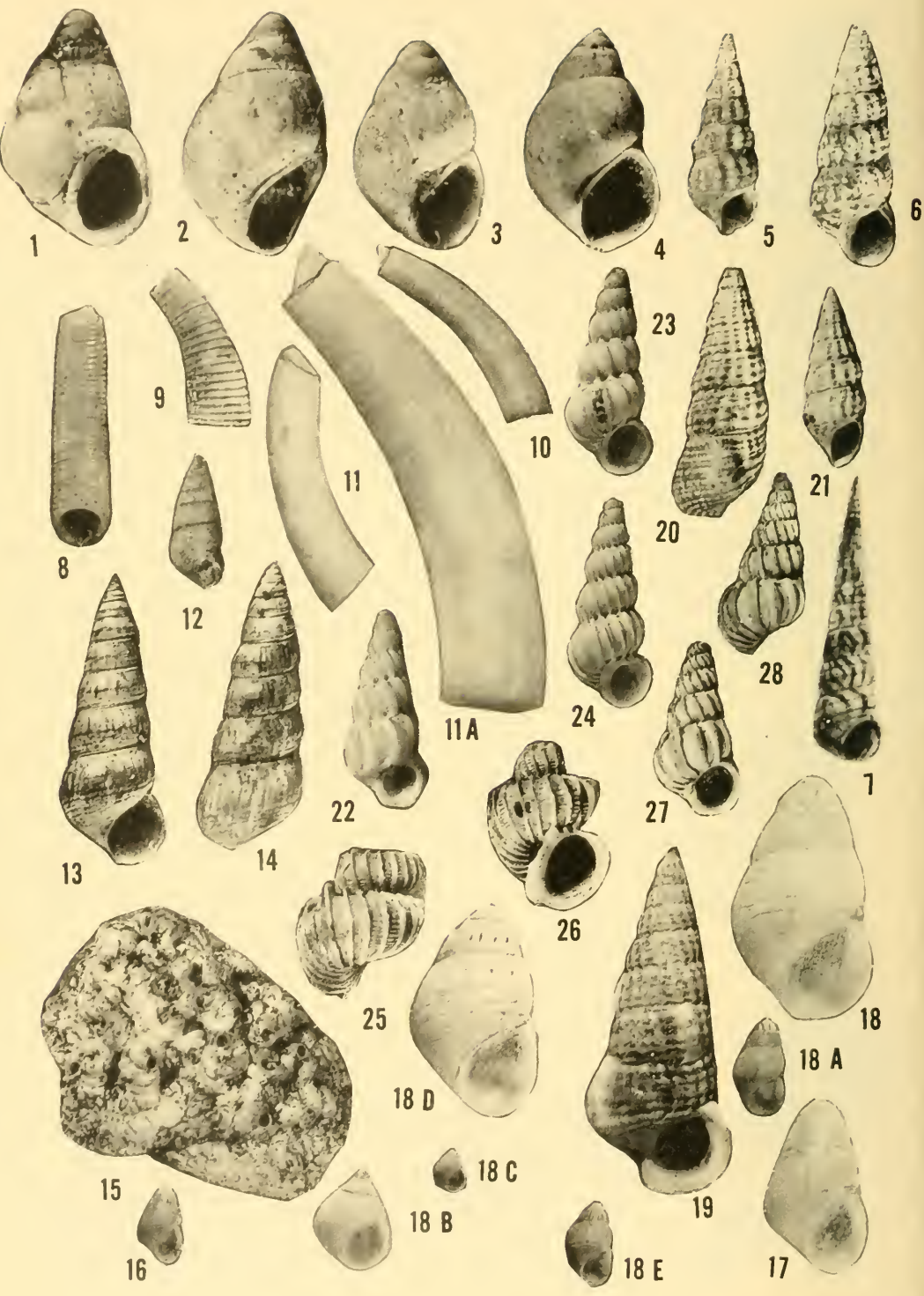
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TEGULA, CYTHINIA, HALISTYLUS, TEINOSTOMA, LIOTIA, ARENE, HOMALOPOMA, ASTRAEA, LACUNA, AND PHASIANELLA



BARLEEIA, TACHYRHYNCHUS, TURRITELLA, CAECUM, MICRANELLUM, ALABINA, PETALOCONCHUS, ALVANIA, CERITHIDEA, DIASTOMA, OPALIA, AND EPITONIUM

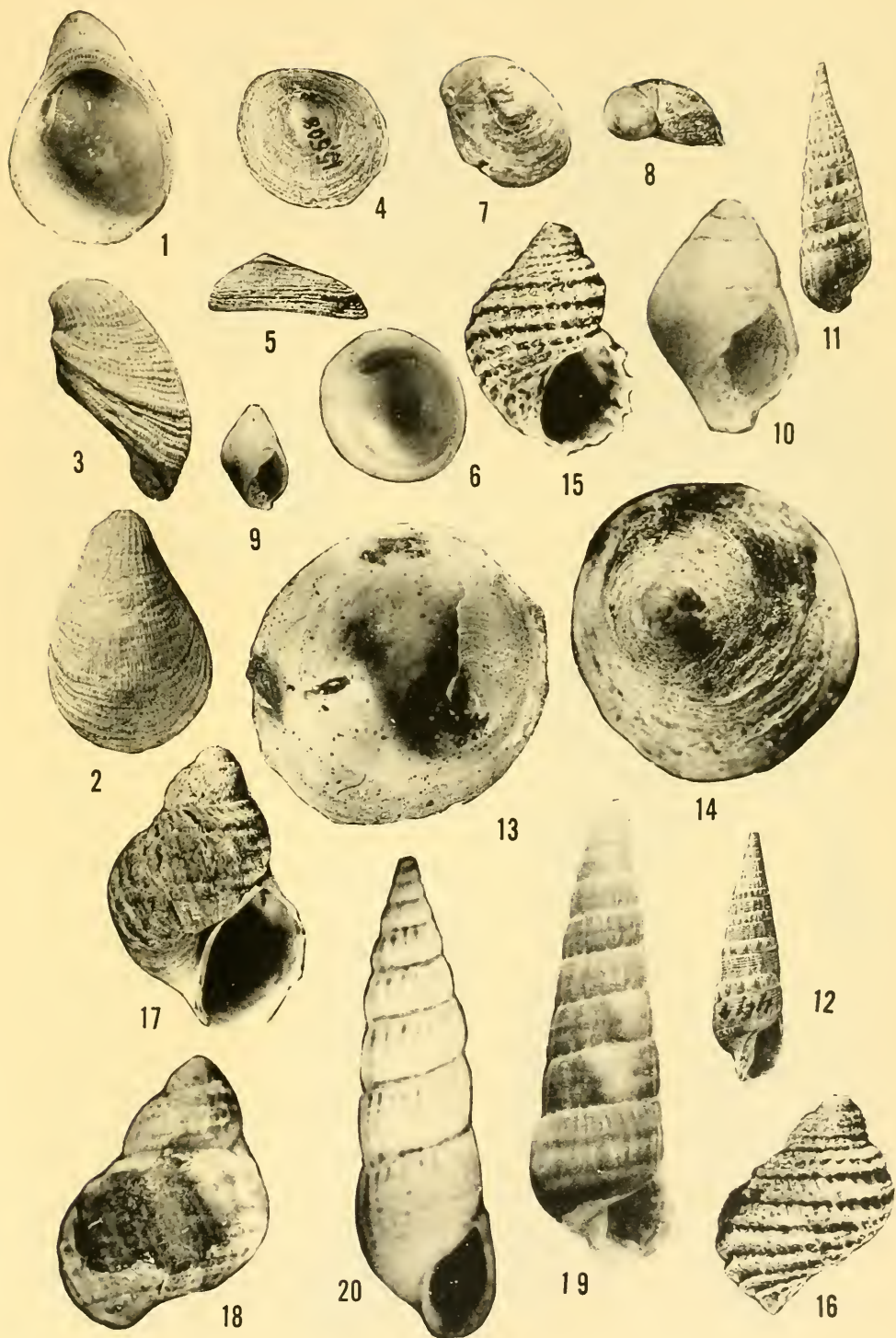
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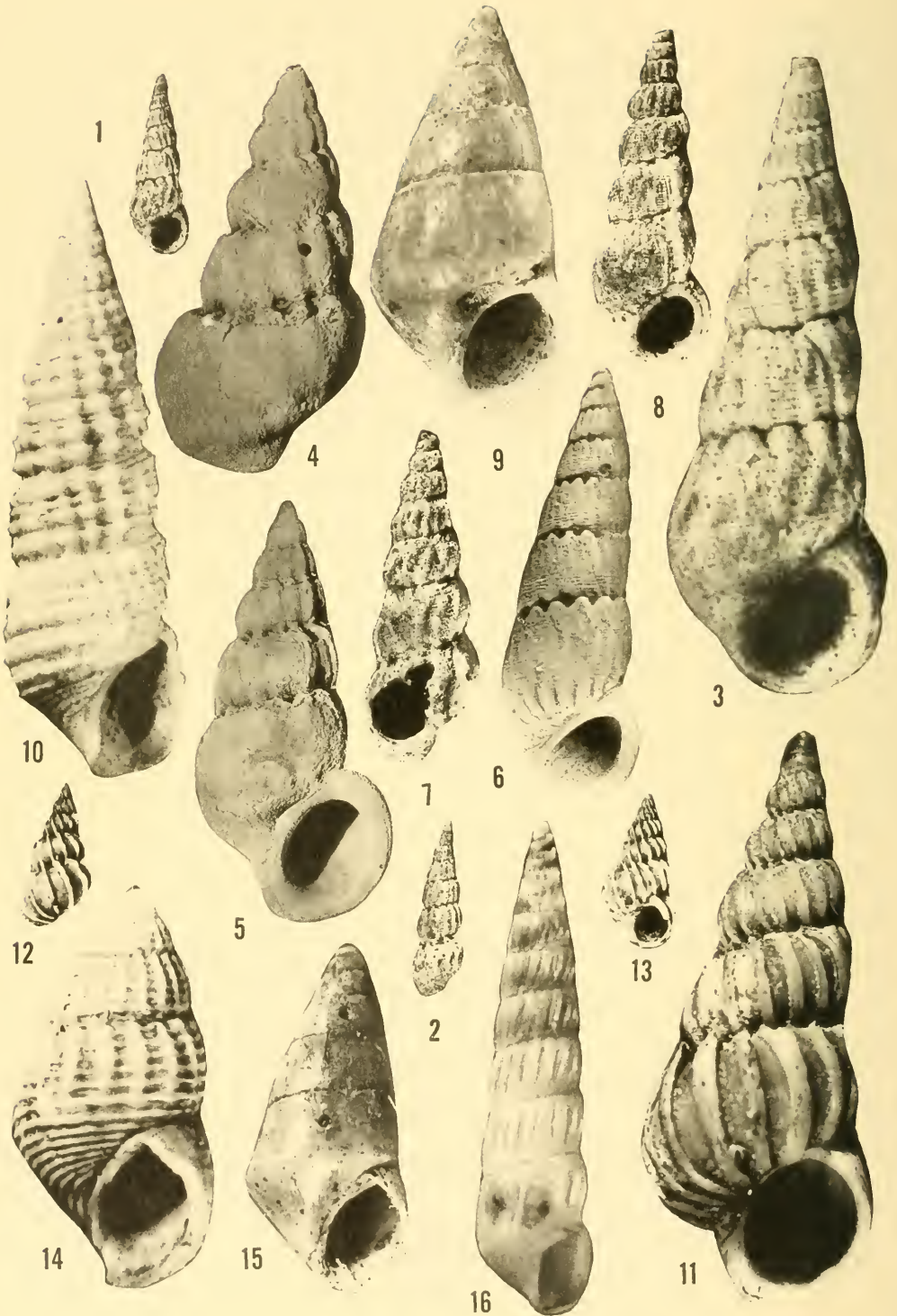
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OPALIA, BARLEEIA, BITTIUM, EPITONIUM, ALVANIA, DIALA, AND TURBONILLA

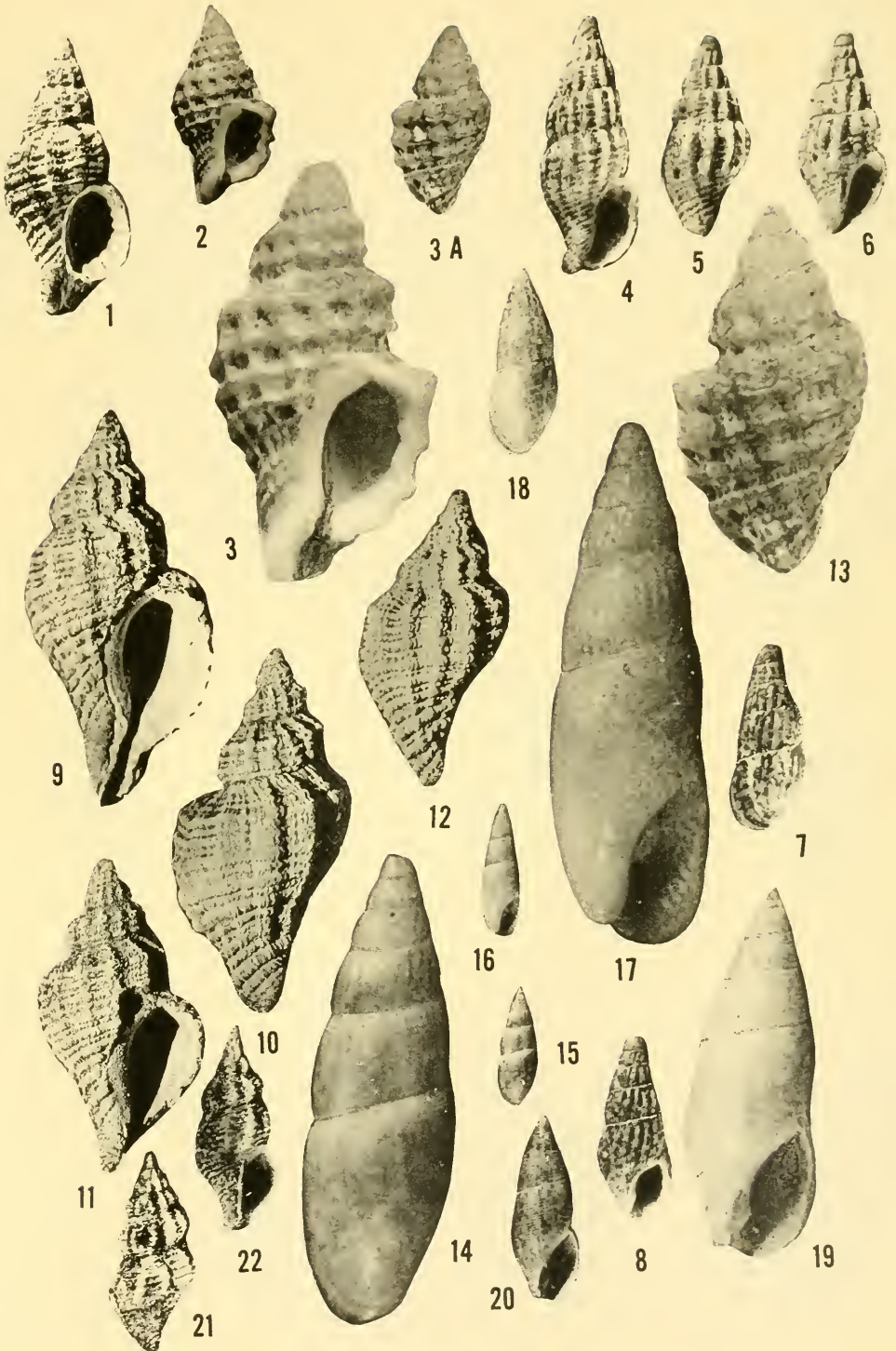
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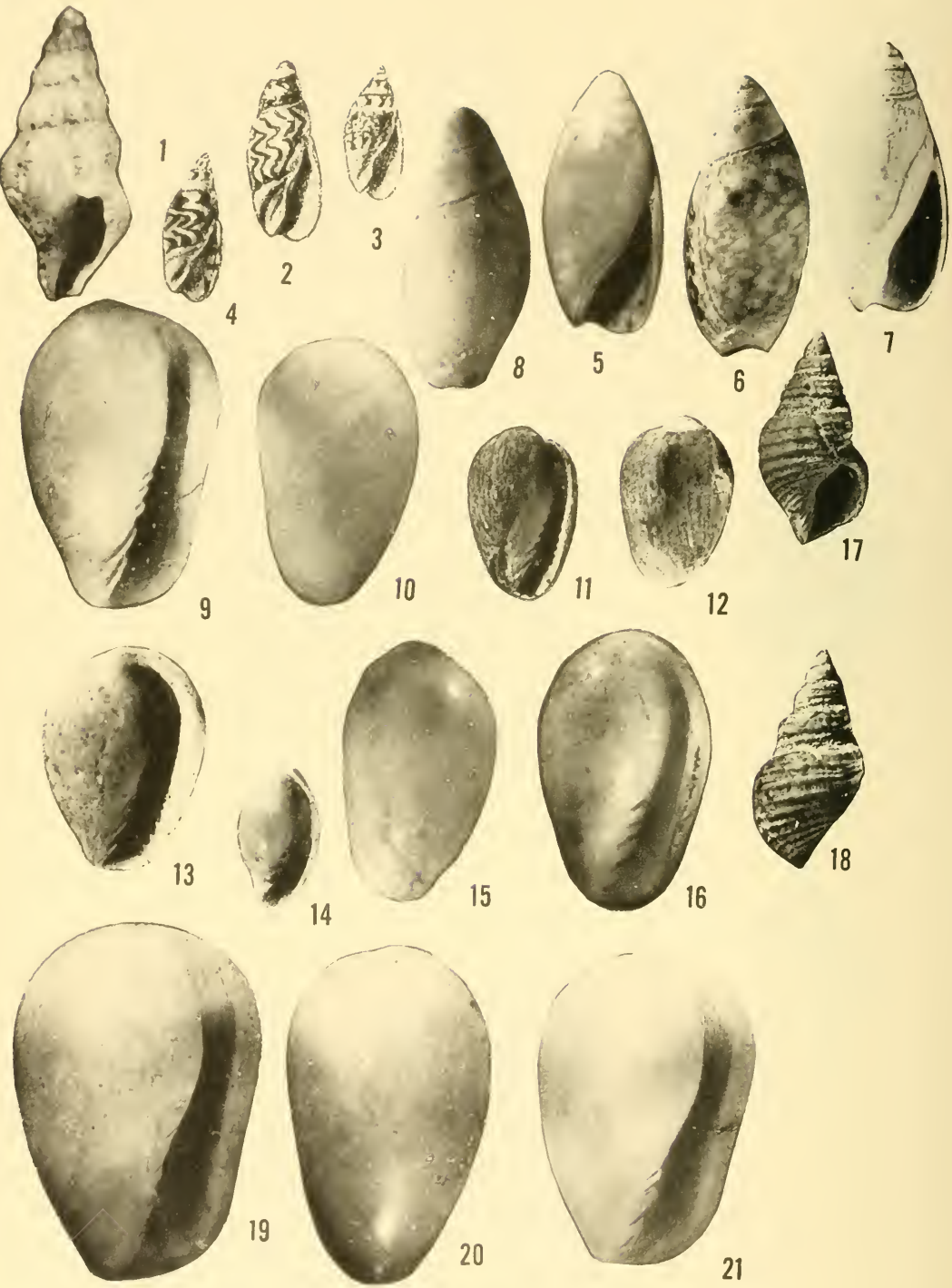
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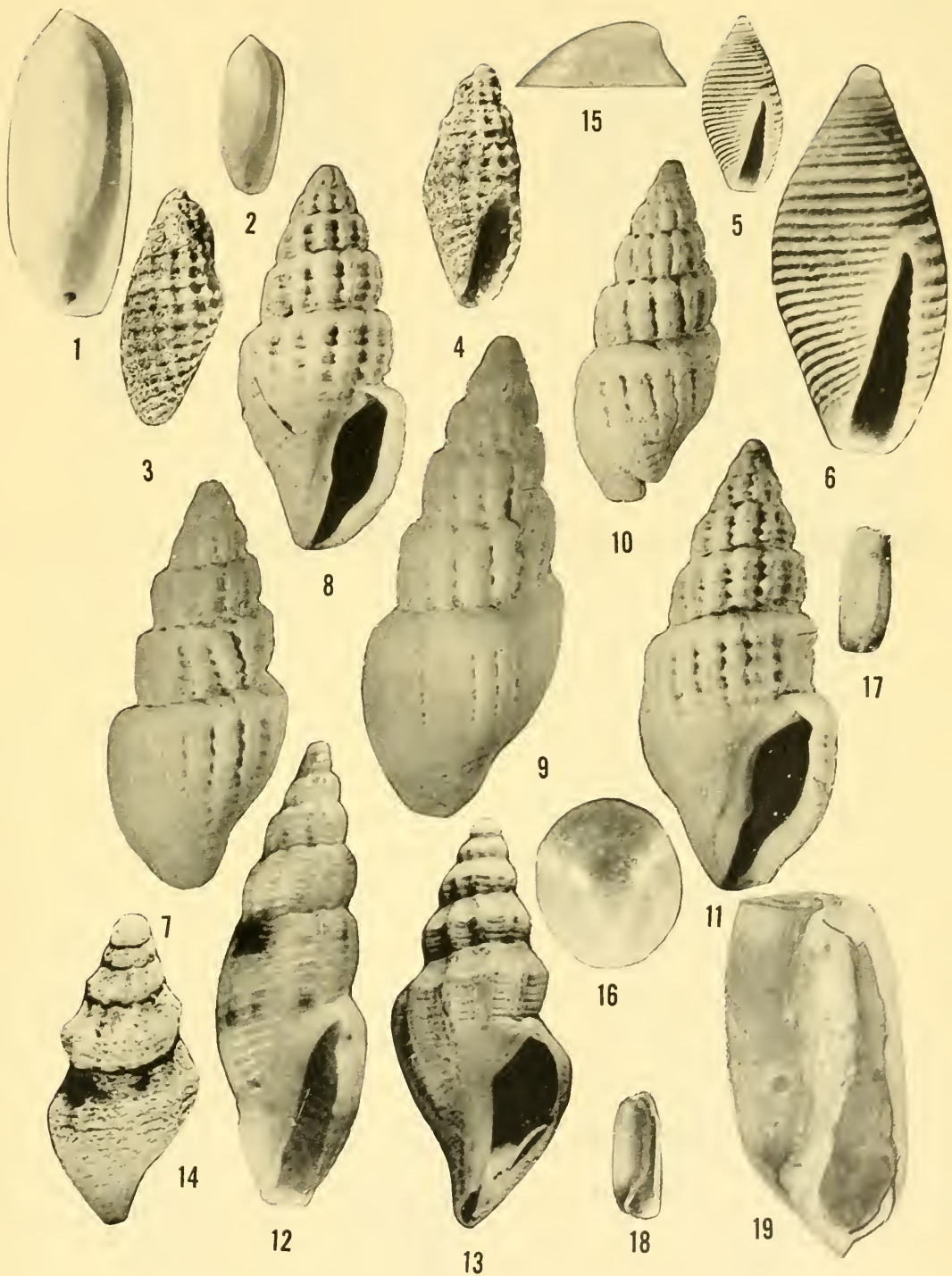


*KELLETIA, OLIVELLA, CYSTISCUS, GIBBERULINA, AND ADMETE*

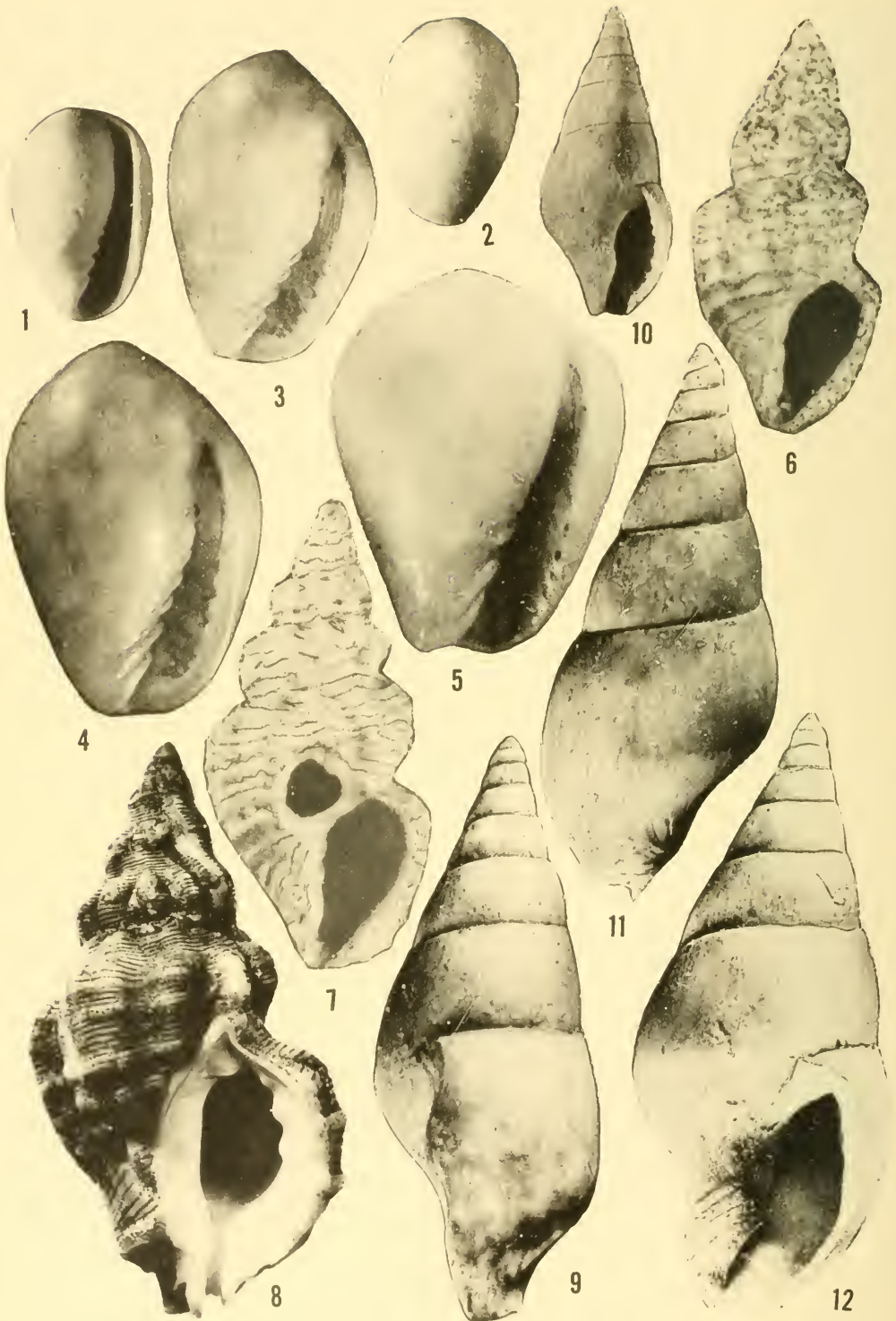
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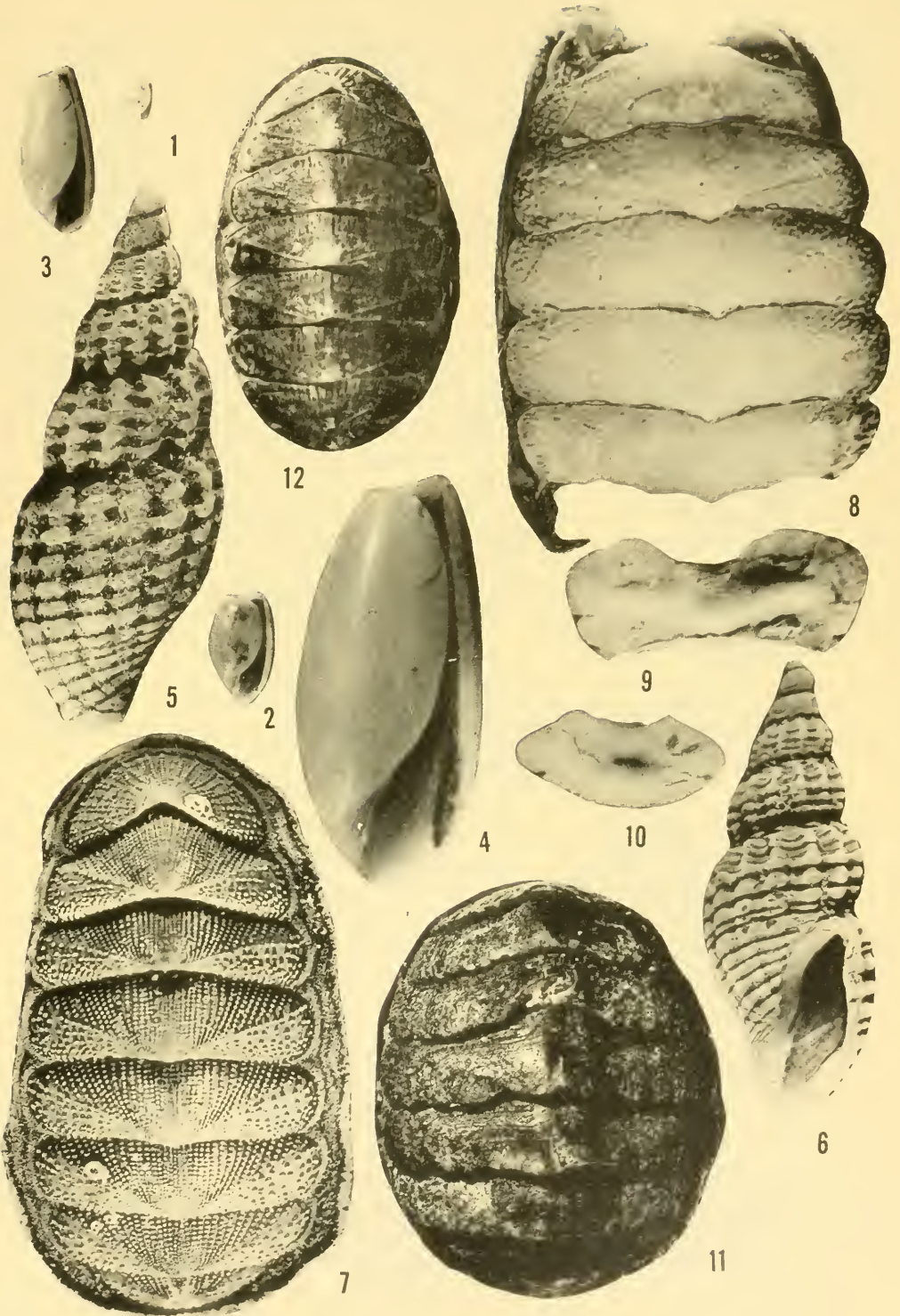
CYSTISCUS, ADMETE, OCENEBRA, AND MITRELLA

PLATE 26.—*CYSTISCUS*, *ADMETE*, *OCENEBRA*, AND *MITRELLA*

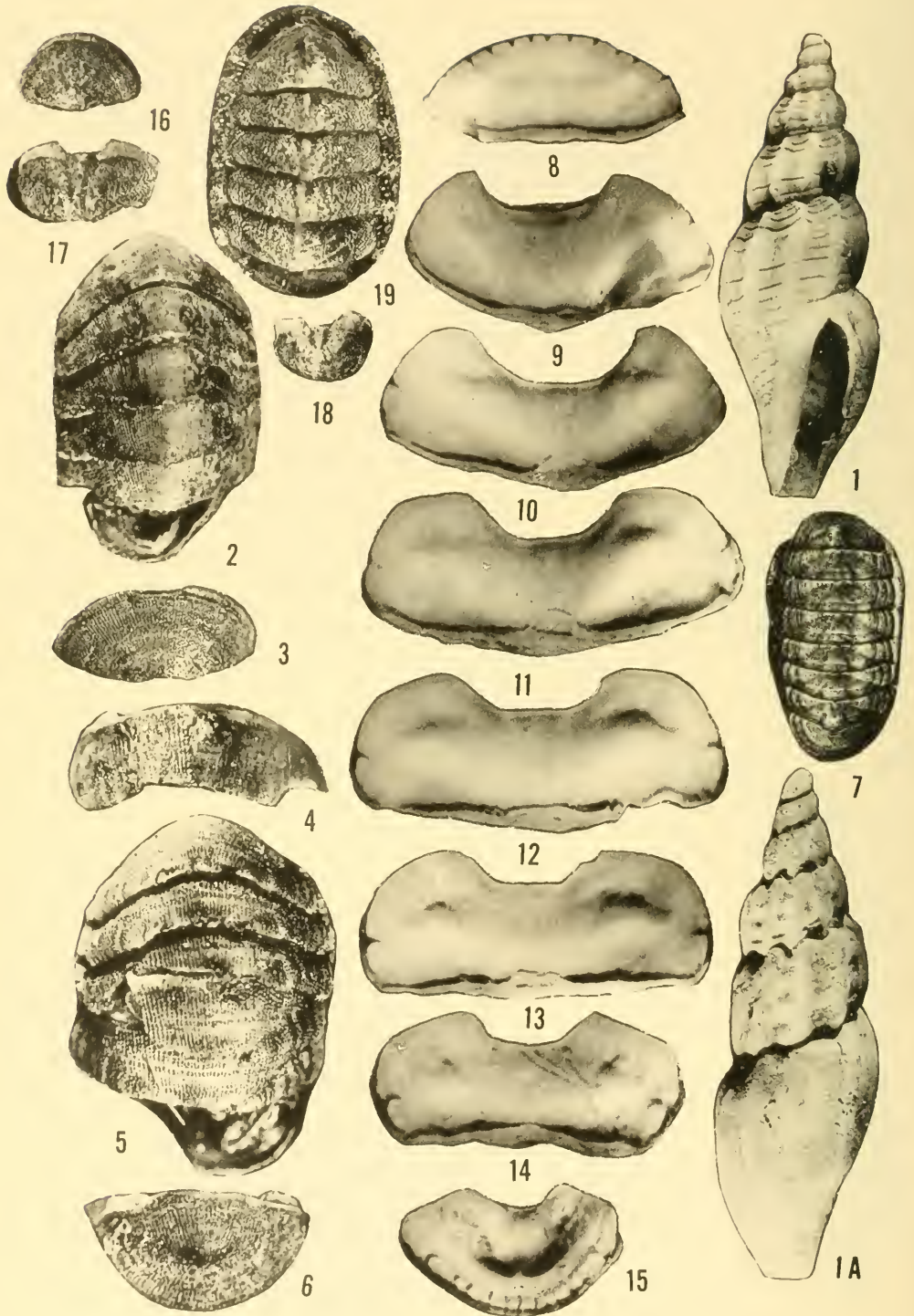
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ATYS, MANGELIA, PALLOCHITON, CYANOPLAX, AND MOPALIA



MANGELIA, LEPTOCHITON, CYANOPLAX, AND NUTTALINA

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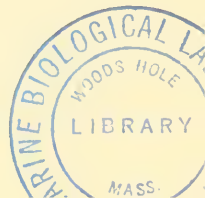
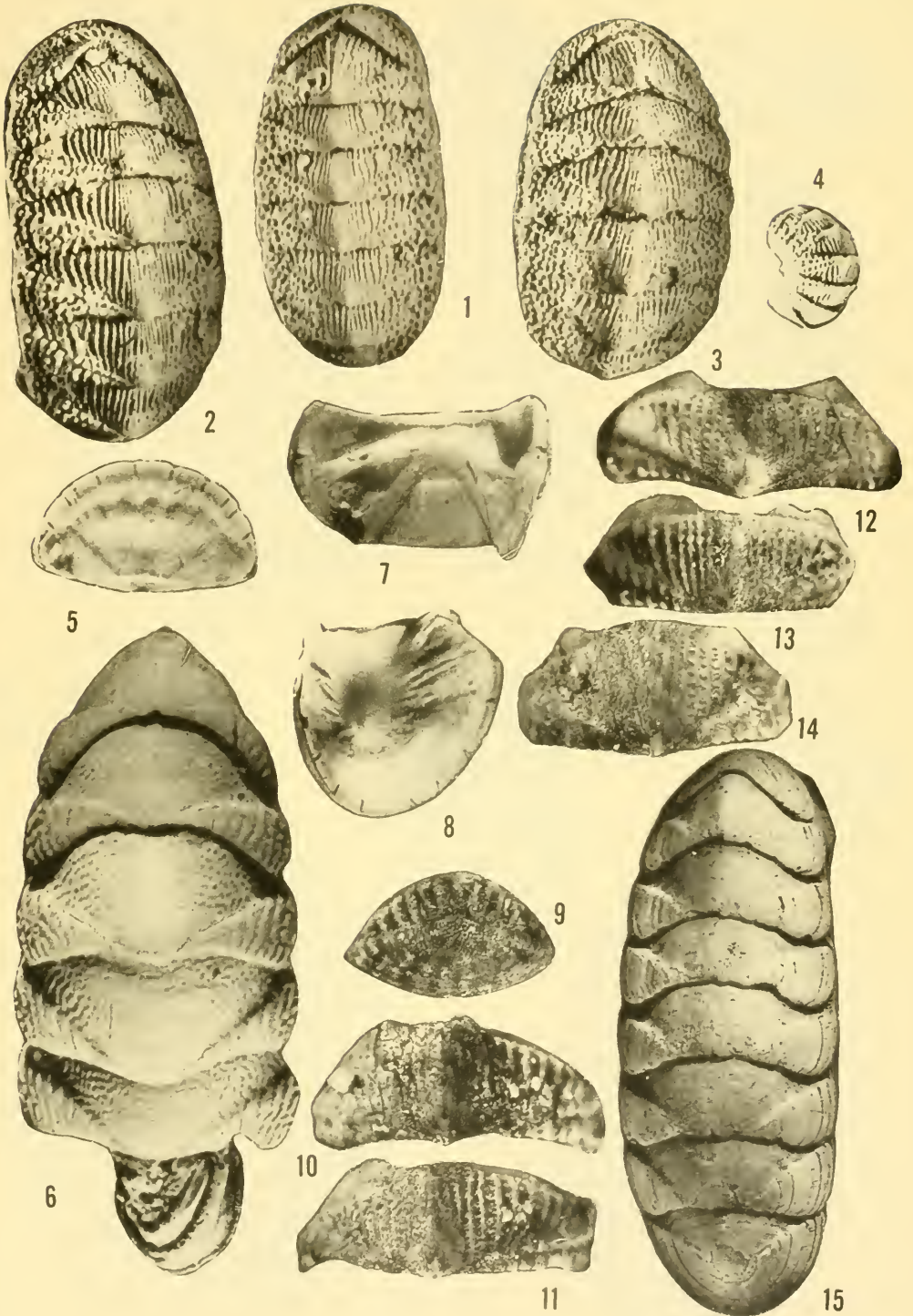


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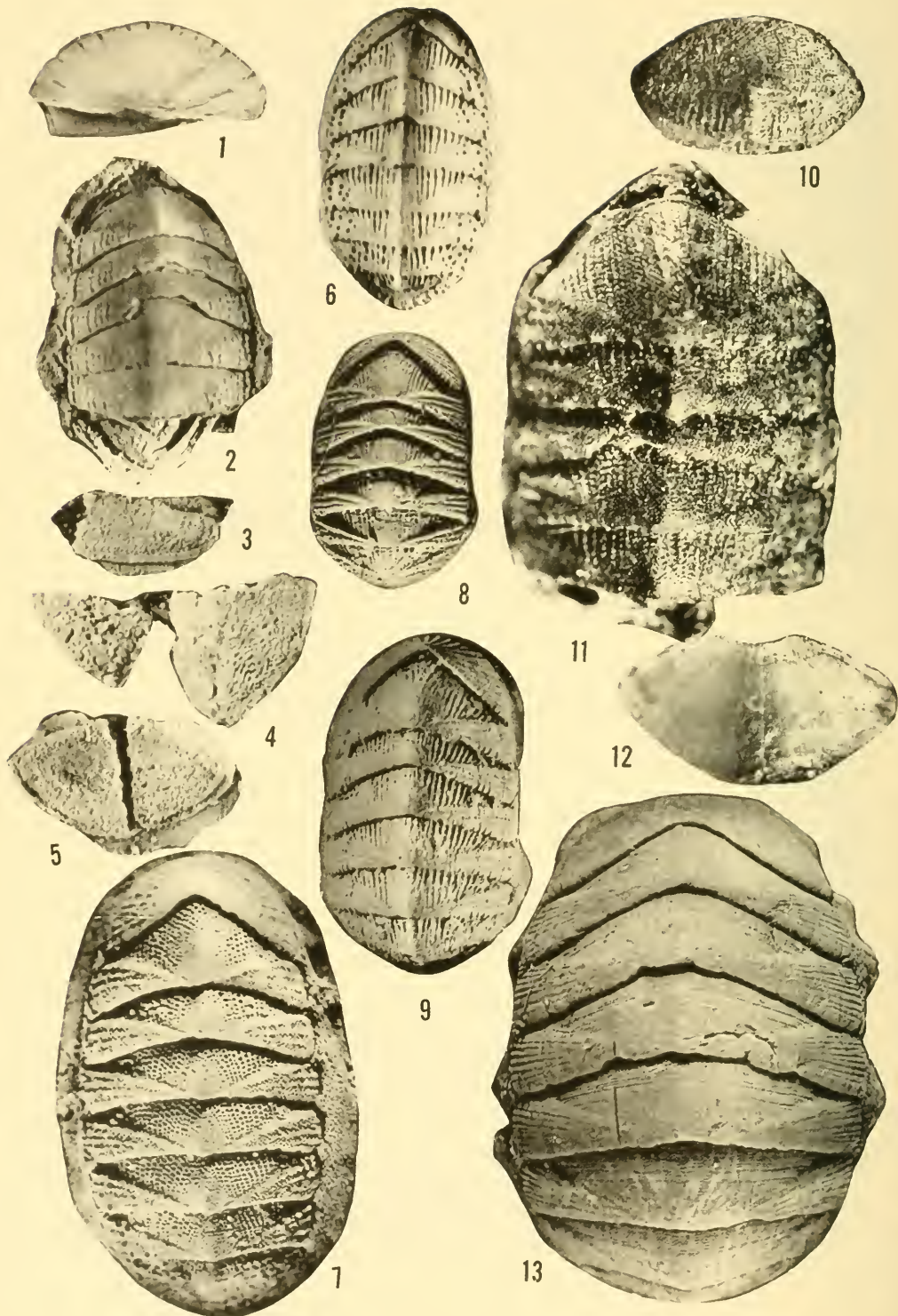


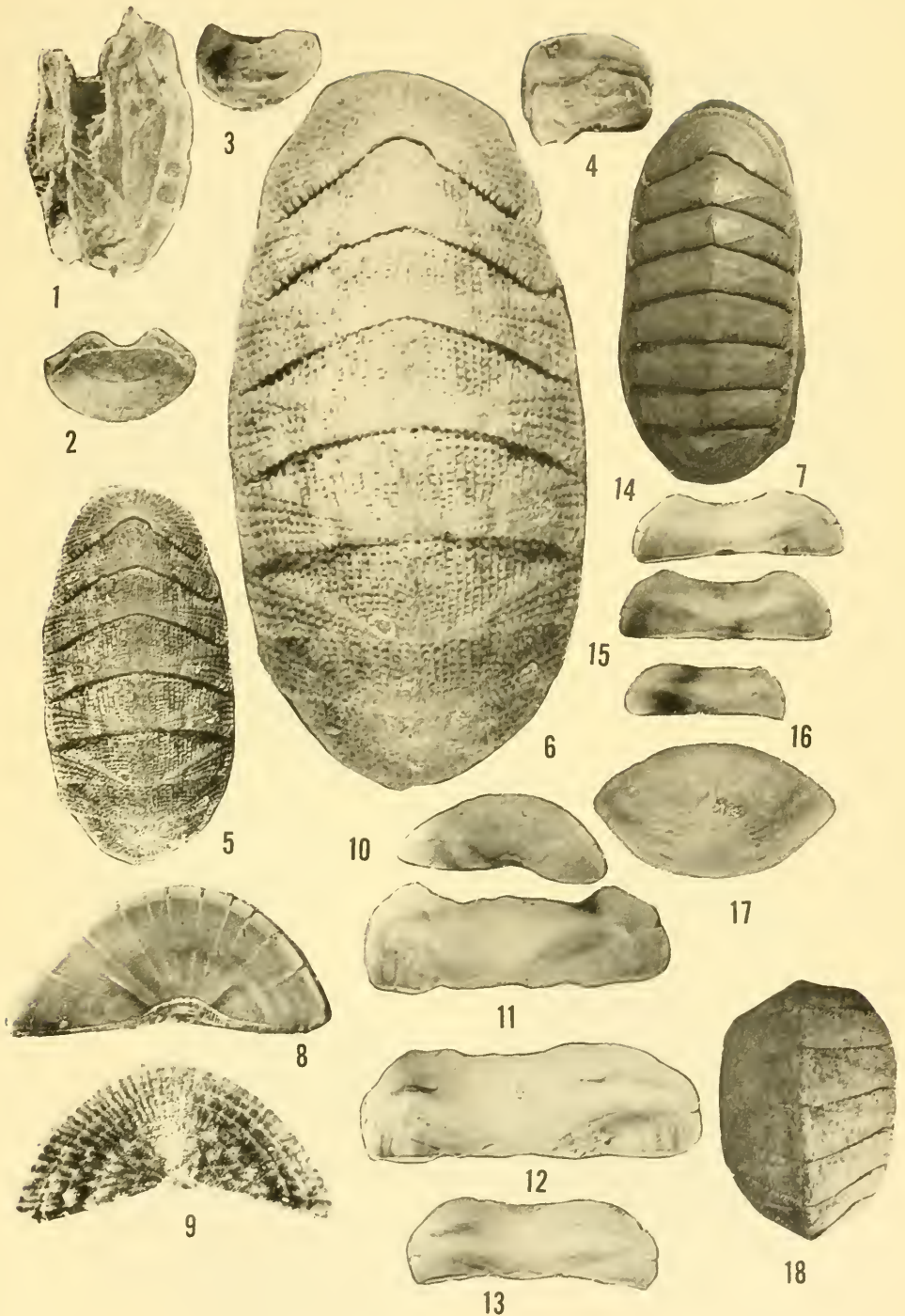
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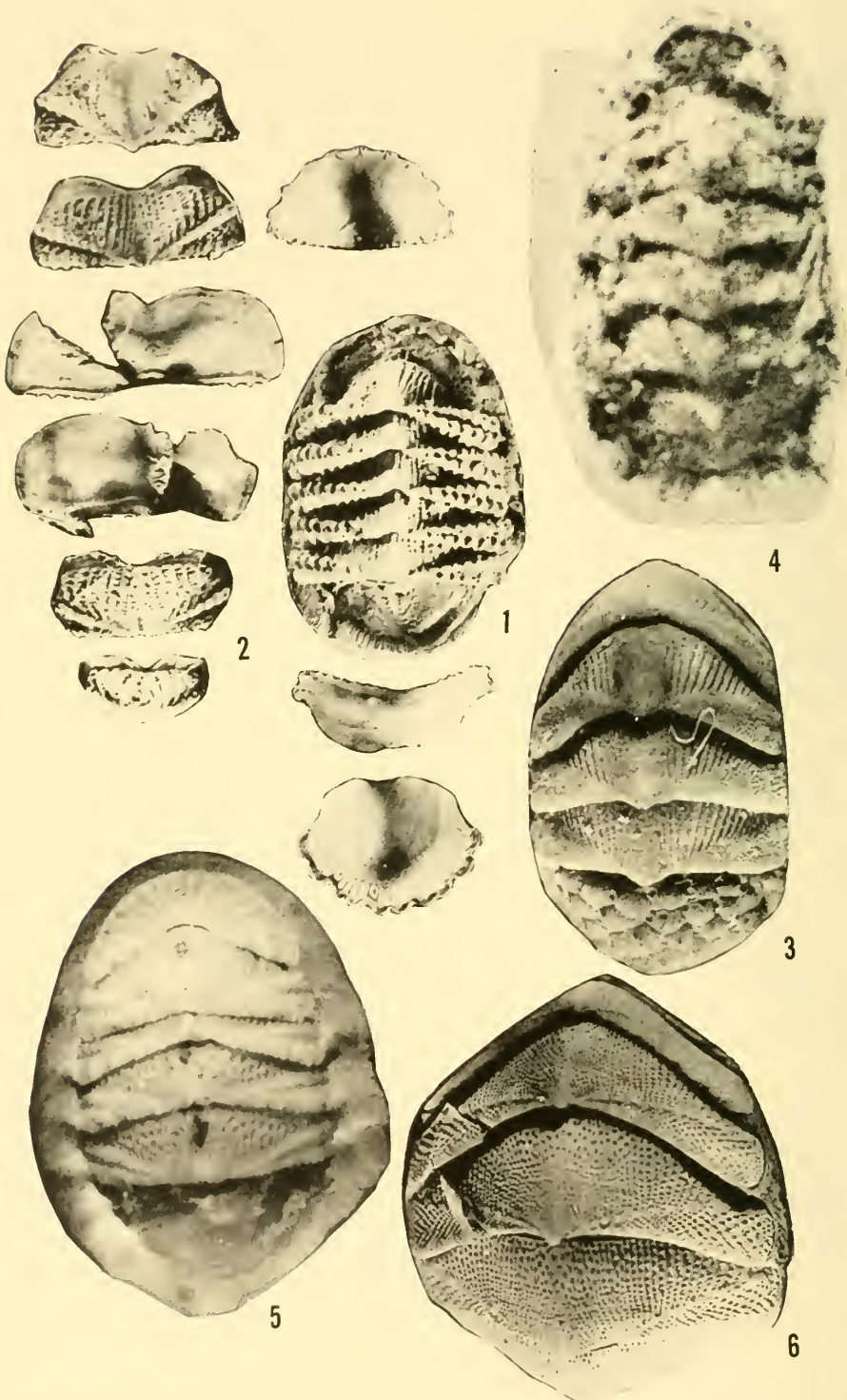
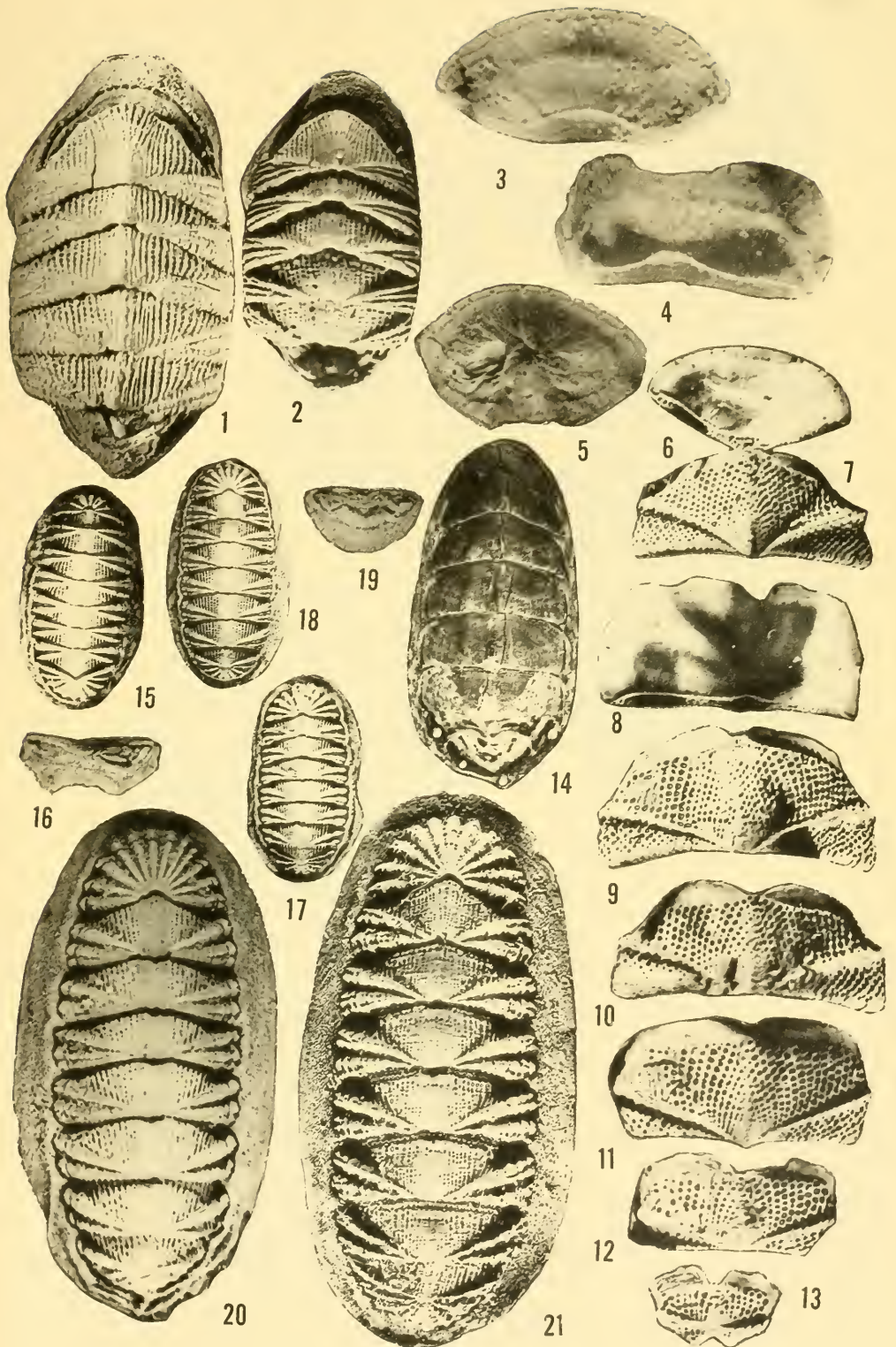


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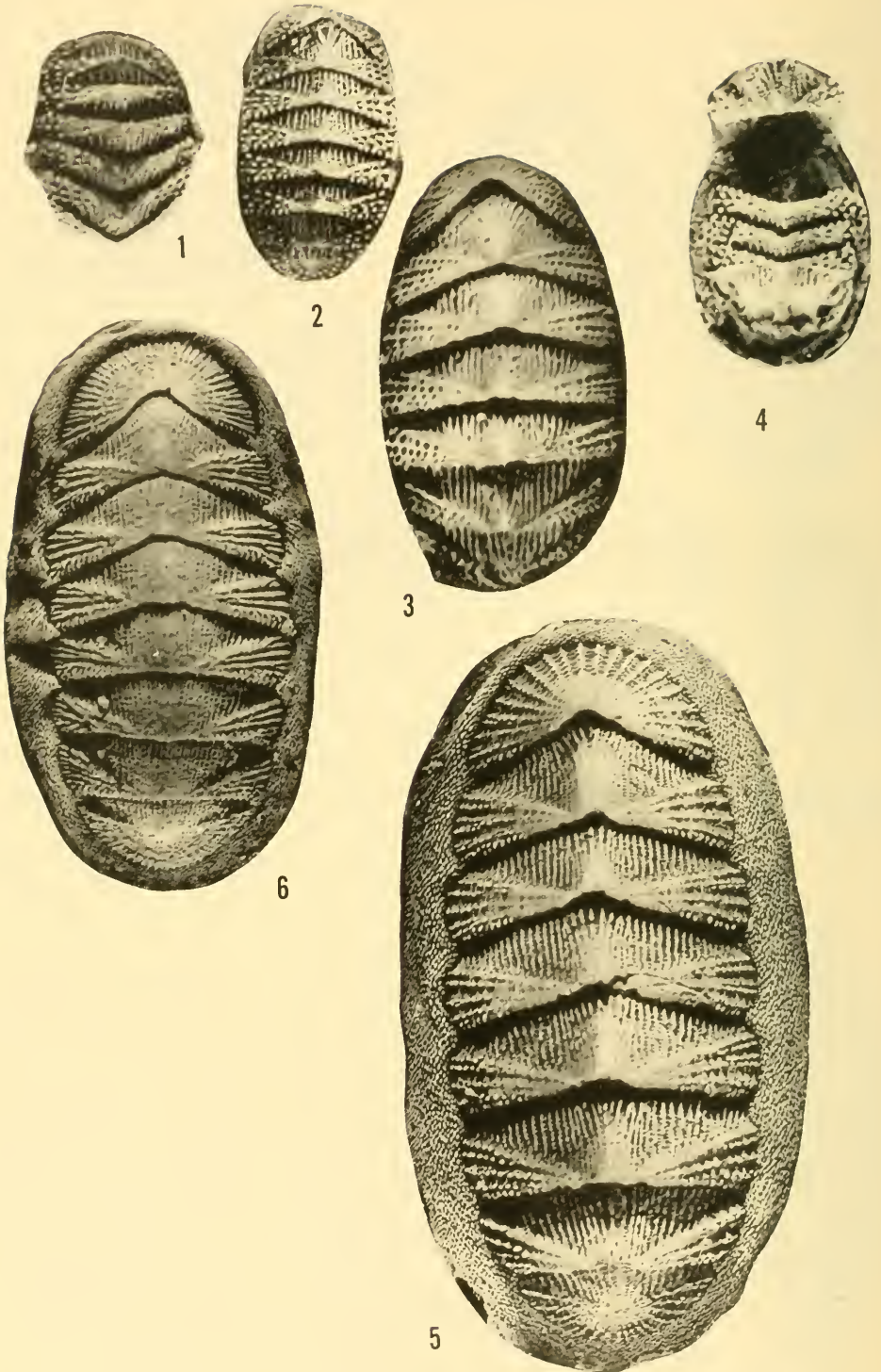
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ISCHNOCHITON, MOPALIA, BASILIOCHITON, AND CALLISTOCHITON



*ISCHNOCHITON COOPERI*

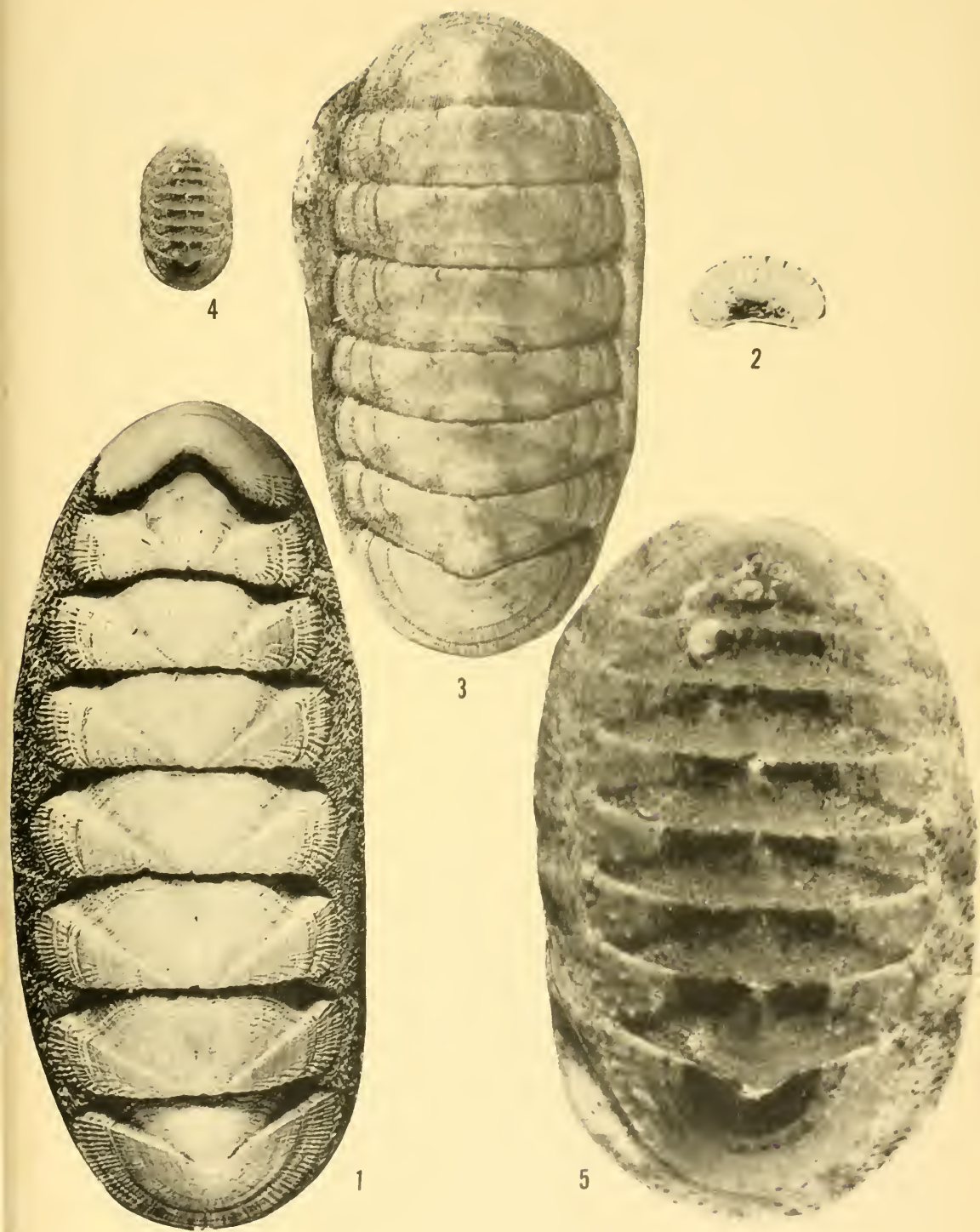
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