

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COM-  
MISSIONS STEAMER ALBATROSS.

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No. XVII.—DESCRIPTIONS OF NEW WEST AMERICAN LAND, FRESH-  
WATER, AND MARINE SHELLS, WITH NOTES AND COMMENTS.

BY

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(With Plates xv-xvii.)

The forms described below are a part of the collections in the Department of Mollusks, U. S. National Museum, and have been received from various sources as indicated in the description in each instance. Those from Dr. C. Hart Merriam were either collected by him personally or by collectors employed by him in connection with the biological explorations of the Department of Agriculture, under his supervision. Others were received from the Hon. Marshall McDonald, U. S. Commissioner of Fisheries. The latter are a part of the *Albatross* collections during the year 1887-'88 made by Prof. Leslie A. Lee and his assistants; and again the collection made in 1855 by the English naturalist, Thomas Bridges, has its representative, contributed by him to the Stearns collection many years ago.

The Museum is further indebted, directly or indirectly, to other collectors whose names appear in connection with the descriptions. For the purposes of comparison figures of certain species contained in the National collections that have not heretofore been figured, or properly figured, are given, with comments thereon, such as naturally arise in the course of a critical examination of related material or forms, the publication of which may be of some service to students of conchology throughout the country who reside at a distance from libraries and museums.

## Order PULMONATA.

## Suborder GEOPHILA.

## Family HELICIDÆ.

Genus *HELIX* Linné.

## Group Arionta Leach.

*Helix* (*Arionta*) *coloradoensis* sp. nov.

Plate xv, Figs. 6, 7, 8.

Shell orbicular, moderately depressed, whorls slightly elevated, apex obtuse, number of whorls four to four-and-a-half, rounded. Umbilicus narrow, showing the penultimate whorl, though partially covered by the reflection of the lip at the point of junction with the base of the shell. Aperture obliquely ovate, nearly circular, and almost as broad as high. Lip slightly thickened and reflected, or simple, varying in this respect; more reflected and aperture more effuse at the columella. Parietal wall in the heavier examples calloused, the callous connecting with the inner edges of the outer lip above and below. Shell rather fragile, thin, translucent; surface smooth and shiny, and sculptured with fine incremental lines. Color pale horn to white, and otherwise marked by a single narrow revolving reddish-brown band just above the periphery, which in some specimens is obscure or absent. In some individuals certain faint scars upon the upper whorls imply an occasionally hirsute character.

	Millimeters.
Maximum diameter of largest.....	15.25
Minimum diameter of largest.....	13.25
Altitude of largest.....	10.25
Maximum diameter of smallest adult.....	13.75
Minimum diameter of smallest adult.....	12.00
Altitude of smallest adult.....	8.75

**HABITAT.**—Grand Cañon of the Colorado, opposite the Kaibab plateau, at an elevation of 3,500 feet. (Mus. No. 104100.)

The above, while exhibiting a facies or aspect of its own, is nevertheless suggestive of *H. Remondi* Gabb, Mazatlan, in the Mexican State of Sinaloa, and also from the high mesas or table-lands in the neighborhood of Mulege, Lower California. *H. Carpenteri* Newcomb, which is a synonym of *H. Remondi*, is credited by the author to "Tulare Valley," and has been found in other localities in California. A glance at the map will show how widely separated geographically, *H. Coloradoensis* is from its nearest allies, and this discovery of Dr. Merriam's extends the distribution of the west coast type of *Helices* farther to the eastward than heretofore, and adds an area of great extent to that previously known,

*Helix* (*Arionta*) *magdalenensis* sp. nov.

Plate xv, Figs. 11, 12, 13.

Shell orbicular, much depressed, apex whorls but very slightly elevated, suture well defined. Whorls three and a half to four, flattened above, slightly obtusely angulated on the periphery, and rounded below. Umbilicus open, showing the whorls; upper line of the mouth more or less slanted downward where it joins the body whorl, varying in this character in different specimens. Aperture broader than high, ovate, somewhat oblique, slightly effuse, and thickened and reflected a little at the edge, more so in the umbilical region, where it partially overhangs the umbilicus. In some examples a thin deposit of callus on the parietal wall suggests a continuous peristome. Surface sculptured by the ordinary lines of growth, which vary in prominence in different individuals. Color, dingy whitish, the specimens, *nine* in number, being dead, with an obscure, narrow, reddish-brown band just above the periphery.

*Dimensions.*

	Millimeters.
Maximum diameter of largest.....	13
Minimum diameter of largest.....	10
Altitude of largest.....	6.50
Maximum diameter of smallest.....	10.50
Minimum diameter of smallest.....	9
Altitude of smallest.....	5.50

**HABITAT.**—Magdalena, State of Sonora, Mexico, on the line of the Sonora, New Mexico and Arizona Railroad, which terminates on the Gulf of California at Guaymas. It was detected by Mr. V. Bailey among rocks on the top of a mountain at an elevation of 1,000 feet above the town. (U: S. National Museum, No. 104094.)

This species in its principal features, indicates a relationship with its geographical congener, *H. Rowelli*, Newcomb, which has been found in the Salt River Mountains, 7 miles north of Phoenix, Arizona (Pilsbry). *H. Lohri* Gabb, which is regarded as a synonym of *Rowelli*, collected by its author on the table-lands of Lower California near Mulege, and it has also been credited to Chihuahua, Mexico, and farther eastward to "Texas," upon what authority I am not aware. The relationship of *H. magdalenensis* to *Rowelli* is like that of the Californian snails *H. exata* to *H. arrosa*, of the small forms of *H. fidelis* to *H. mormonum*, or of *H. Stearnsiana* to *H. Kelletii*, etc. Its dimensions are in every way less than those of *Rowelli*+*Lohri*.

The helicoid forms described herein belong to the *Arionta* group, and may be regarded as the southern geographical aspect or an extreme or extra-limital expression thereof. I agree in the main if not altogether with Mr. Pilsbry in his remarks as contained in the paragraph under the head *Lysinöë* in the Proceedings Academy Natural Sciences of Philadelphia, 1889, page 193,\* criticising the generic terms, etc., heretofore

\* Nomenclature and check-list of N. A. land shells.

applied to the helicoids of the Pacific slope, but I do not perceive the propriety of substituting the generic name *Iysinoë*, H. & A. Ad., 1855, any more than *Aglaiia* Albers 1860, for *Arionta* Leach 1820. As for *Helminthoglypta*, *Micrarionta*, *Euparypha*, etc., as applied to the West coast snails, there is nothing in them more or less than a beggarly threshing of beaten straw, not a grain of wheat, or in other words propriety or advantage in their use, neither should *Ampelita*, which is illustrated by the African *H. sepulchralis*, be applied to any of the West American species, as it has been to *Rowelli*, on insufficient and superficial grounds.

### Family PUPIDÆ

Genus **HOLOSPIRA**, Von Martens.

*Holospira semisculpta* sp. nov.

Plate xv, Figs. 1, 4.

Shell dextral, elongately cylindrical, pupiform, largest in the middle, tapering above and below, with fourteen to fifteen whorls; whorls somewhat convex; sutures distinct, though but slightly impressed. The upper two or two and a half whorls which form the apex are smooth, slightly tortuous, papillose. The succeeding four to five whorls are finely obliquely plicated; the middle whorls, four to five in number, are nearly or quite smooth, the sculpture when apparent being inconspicuous. The lower three or three and a half whorls are marked by sharp, thin, and rather obliquely curved liræ, which increase in number or closeness as the mouth is approached. The termination of the basal whorl projects considerably, is sharply angulated above on the projecting portion, which is also obtusely angulated on the under side. Aperture continuous, moderately effuse roundly ovate, and flatly rimmed. Umbilicus a simple chink. Shell of a delicate pinkish white, with a tint of faint purple on some of the upper whorls. Dimensions: Longitude 22 to 23½<sup>mm</sup>, greatest diameter 5½ to 6<sup>mm</sup>, number of specimens three (Mus. No. 102310). This well characterized and very pretty species was obtained by Mr. T. W. Stanton, who detected it July 27, 1889, in a cañon above San Carlos, Chihuahua, Mexico, attached in a dormant condition to limestone cliffs. [Since the above was written I have come across a specimen of *H. Coahuilensis* W. G. B., quite unsatisfactorily described by said author; the example is somewhat imperfect, but suggests a geographical if not a more intimate relationship with *H. semisculpta* herein described; the latter may prove to be a variety of Mr. Binney's shell.]

*Holospira arizonensis* sp. nov.

Plate xv, Figs. 2, 3.

Shell dextral, elongately cylindrical, pupiform, dingy white to pale horn color, translucent. Number of whorls twelve to thirteen. Slightly convex, the sutures distinctly defined. The upper or six or seven



whorls rather abruptly tapering towards the obtuse apex, which has a slightly twisted and rather a papillose aspect. The last whorl is curved under and constricted back of the mouth, forming an umbilical notch. The apex and following whorl are smooth; the three or four succeeding whorls sharply and somewhat obliquely plicated longitudinally, the median and following whorls becoming somewhat obscurely sculptured other than by distinct growth lines. The basal whorl is strongly sculptured below, and back of the mouth, and obtusely angulated underneath. Aperture ovate, slightly angulated anteriorly, somewhat effuse, rimmed and projecting. The dimensions of two examples are as follows:

	Millimeters.
Longitude .....	12½
Longitude .....	13
Greatest diameter .....	4
Greatest diameter .....	4

HABITAT—Dos Cabezas, Arizona, where the above two specimens and numerous fragments were found in a cave in November, 1889, by V. Bailey, and contributed to the U. S. National Museum (No. 104392) by Dr. C. Hart Merriam.

Among the species of this group that are geographically related is *H. Remondi* Gabb, described from Arivechi, Province of Sonora, Mexico, a form sharply sculptured throughout, and in minor features also different; *H. Pfeifferi* Menke, collected by Remond at Hermosillo, in the same province, with the previously named species; and *H. (Caelocentrum) irregulare* of Gabb from the high table-lands back of Mulege, in the peninsula of Lower California. All of these are separable at a glance from *arizonensis*.

M. M. Fischer and Crosse, in the "Mission Scientifique au Mexique et dans l'Amerique Central,"\* point out the geographical as well as conchological and malacologic relations and characteristics of the group *Holospira*, and furnish a résumé of the species thus far † made known. Their distribution geographically considered is decidedly Mexican and semitropical, and the relations of the shells when the shell characters are considered, as well as certain of the anatomical details, indicate a closer affinity with the *Pupidae* than with the *Cylindrellae*. That there should be what we may be permitted to call outlying posts, and areas exterior to the territory of Mexico, where this general form is represented, may reasonably be expected, for the distribution of life is governed by physical conditions, not by political lines. Quoting from the authorities above cited, we find the number of species in this group up to the date of the foregoing publication to be *thirteen*, supposing the species described to be valid and not synonymous. The names and distribution of these is as follows:

(1) *H. Pfeifferi* Menke, Tehuacan, in the province of Puebla, and variety ( $\beta$ , C. and F.) Hermosillo, in the province of Sonora.

\* Septieme partie.

† 1873.

(2) *H. Remondi* Gabb, near Arivechi, valley of Sahuaripa, in the province of Sonora; also a *variety* ( $\beta$ , C. and F.) of same.

(3) *H. teres* Menke, province of Puebla; special habitat not stated; of this there is also a *variety* ( $\beta$ , C. and F.).

(4) *H. goniostoma* Pfr., Mexico; special habitat not given.

(5) *H. Pilocerei* Pfr. The typical form was found in the neighborhood of Cnautla de las Amilpas, province of Puebla, and a *variety* ( $\beta$ , C. and F.); no other locality given than "Mexico."

(6) *H. Tryoni* Pfr., Matamoros de Izucar, State of Puebla, and a *variety* of same ( $\beta$ , C. and F.).

(7) *H. Gealei* H. Adams, Putla, in the State of Oajaca.

(8) *H. Coahuilensis* W. G. Binney, Cienga Grande, State of Coahuila

(9) *H. cretacea* Pfr., "Mexico."

(10) *H. imbricata* Martens, habitat as given "? Mexico," is in all probability correct; "l'ensemble de ses caractères" are, according to Crosse and Fischer, sufficient to indicate its geographical relations.

(11) *H. microstoma* Pfr., ? Mexico. The remarks as to habitat in connection with the previous species may be applied to this with equal propriety.

(12) *H. Goldfussi* Menke, "Texas, on the Blanco," W. G. Binney.

(13) *H. Roemeri* Pfr., "New Braunfels and Howard Springs, Texas, W. G. Binney.

Of the varieties given by Crosse and Fischer, distinguished as " $\beta$ " of the species *Pfeifferi*, *Remondi*, *teres*, *Pilocerei*, and *Tryoni*, the number of the whorls, size, and sculptural development are, in the main, the basis of varietal distinction. To these may be added another characteristic more or less mutable, the extent of the projection of the basal whorl at its termination from the body of the shell. This varies considerably as a comparison of many individuals will show. The other characters are, we may assume, equally unstable or nearly so, and a large or extensive geographical series would without doubt connect the admitted species and so-called varieties by so gradual a blending of one into the other as to efface the present lines of demarkation. The authors above quoted suggest that *H. Tryoni* may prove to be a variety of *H. Pilocerei*; the latter is largely represented in the national collection, as well as *Tryoni*; a comparison of these hardly sustains the suggestion. Dr. Palmer found somewhere in his rambles in Arizona, Mexico, or New Mexico, a somewhat dwarfed and rather solid form of *Holospira*, that with the exception of size and solidity may be regarded as *H. Pilocerei* (Mus. No. 29303), and it is so named in the collection.

A comparison of individuals shows that the shape of the mouth, the strength of the sculpture, the projection of the basal whorl at its termination, and size, are all variable factors more or less coincident with proximity or remoteness of habitat, or in other words with geographical relations.

To the above enumeration and list must be added :

(14) *H. Elizabethæ* Pilsbry, detected in the "Village of Amula, between Tixtla and Chilopa, State of Guerrero, Southwestern Mexico," a form which in its general features much resembles *H. Gealei*, and may prove to be a geographical variety thereof.

(15) *H. semisculpta* Stearns, near San Carlos, Chihuahua, Mexico.

(16) *H. arizonensis* Stearns, Dos Cabezas, Arizona.

## Order CTENOBRANCHIATA.

### Suborder STREPTODONTA.

#### Superfamily TÆNIOGLOSSA.

#### Family STREPOMATIDÆ Haldeman.

##### Genus GONIOBASIS Lea.

##### *Melania* (? *Goniobasis*) *acutifilosa* sp. nov.

Plate xv, Fig. 9.

Shell slender, elongated; whorls rounded, convex; sutures much impressed. Spire eroded above the fourth whorl. Surface sculptured with strong thread-like revolving keels alternating with broad channels; of these keels there are usually six on the body whorl, sometimes more, and generally three only on the preceding whorls, of which the upper two are rather the most prominent and are usually interrupted and regularly broken up, producing an evenly crenulated chain. Following the wind of the shell and just below the sutures, the whorls broadly slope to the succeeding keel, which gives the shell a turritid outline. Surface of shell a very dark horn color, blackish; aperture small, ovate, inside lighter colored than the surface, the substance of the shell being thin and partially translucent, the keels showing through on the inside of the mouth, when held up to the light. Dimensions of largest: Longitudinal, 16.50<sup>mm</sup>; latitudinal, 7.50<sup>mm</sup>.

The foregoing description is based on an examination of some three dozen specimens.

HABITAT.—Eagle Lake, California, where this well characterized and interesting form was detected by Mr. Henry W. Henshaw, in June, 1877. (U. S. National Museum collection, No. 60596.)

The above species has the slender habit of other related West American forms, such as *silicula* Gould (= *Shastaënsis* Lea), and *nigrina*, *rubiginosa*, and *Bairdiana*, of Lea. Its sculpture relations are nearer to *occata* Hinds, but that is a robust and more ventricose shell, closely spirally sculptured over and throughout, and lacking the broad sub-sutural slope and differing in other minor features as well as in the character of the aperture, which in Hinds's species is much the largest and more effuse.

The occurrence of the above in the region where Mr. Henshaw found it is not simply interesting in itself, through adding a new locality as well as a new species to what was previously known, but the altitude of Eagle Lake, 5,115 feet above the sea, being considered, is an important point in the matter of the hypsometrical distribution of the group to which the form herein described is allied, and is, so far as I can learn, the highest elevation at which any American species has as yet been detected. The character of the habitat is in another aspect peculiar. The basin of the lake, according to Mr. Henshaw, is composed of a dark-colored lava or scoriaceous matter, and the color of the shell, it would seem, is quite in harmony with this feature of its environment.

As to the generic and malacological relations of those West American forms which Mr. Tryon has included in his monograph of the *Strepomatida*, but little, if anything, is known. Whether their proper place is with the true Melanians or with the East North American *Goniobasis* remains to be shown. It may be found that they constitute, and upon reasonably satisfactory characters, a separate though collateral group. The species above described is therefore placed here provisionally.

### Family CAPULIDÆ.

#### Genus CAPULUS.

#### *Cyclothyca*, Subgenus nov.

Shell small, spiral, few whorled; spire short, and body whorl large and transversely elongated or produced. Aperture oblong, ovate, more or less oblique, very large, continuous and effuse. Surface spirally ribbed and marked with longitudinal growth lines. Example *C. corrugata* as follows:

#### *Cyclothyca corrugata* sp. nov.

Plate xv, Figs. 5, 10.

Shell subspiral, transversely much elongated or produced; number of whorls two to two and a half, rapidly enlarging. Apex rounded, smooth or nearly so, subvitreous and shiny. Aperture ovate, effuse and continuous, obliquely expanded and much prolonged. Surface of principal whorl ornamented with ten to fifteen revolving ribs, of which the upper or principal ones, seven or eight in number, are the more prominent; otherwise sculptured by more or less conspicuous subsidiary longitudinal growth lines. Sometimes the main ribs, which are broadly channeled between, show slight imbrications, and in one of the specimens the longitudinal growth lines, though secondary to the revolving ribs in prominence, are conspicuously developed and cancellate the sculpture. The apex also varies in prominence; in the example figured it is quite elevated, in another it is nearly appressed to the line of the body whorl. The outer lip is ribbed internally corresponding to



the exterior sculpture, and the aperture is smooth and glossy. The color in one example is yellowish white, in the other the groundwork is of said tint but apparently partially mottled with gray. Dimensions: Altitude 3; latitude 4.25<sup>mm</sup>. Altitude of mouth, 1.75; latitude 2.50<sup>mm</sup>.

HABITAT.—West coast of Nicaragua. Two examples, in the collection of the U. S. Nat. Museum (No. 101944).

This peculiar and interesting form has in a very general way the aspect of a tiny *Stomatia phymotis* and is probably parasitic in its habits like *Thyca*, or a domiciliare on some form like *Echinus*. The Adams's subgenus *Thyca* is based on a shell that is "crystalline, acutely conical, slightly curved, longitudinally grooved, parasitic on star-fishes." They include two species, *astericola*, H. & A. Ad., and *crystallinus* Gould; which latter is a small Helcion-shaped form, with the apex marginal and somewhat recurved, as in many of the *Hippocyidae*, which it, *crystallinus*, judging by the figure in Gould's Atlas of the Shells of the Exploring Expedition, resembles much more than most examples of *Pileopsis* (= *Capulus*) to which the author referred it. It can hardly be included in the Adams's narrowly restricted subgeneric description. I have thought it better to make a new subgenus than to expand that of *Thyca*, as it is not improbable that other forms will sooner or later be brought to the knowledge of conchologists, that would be naturally grouped with the species described above; perhaps "*Pileopsis*, Fig. 2381, ? *P. Delessertii*" Chenu (*vide* Manuel de Conchyliologie, vol. i, p. 329), should be included in my subgenus, as judging by the figure it is a true spiral shell. I have not been able to find any description of Chenu's shell.

## Suborder ORTHODONTA.

### Superfamily RHACHIGLOSSA.

#### Family MITRIDÆ.

##### Genus MITRA Lamarek.

##### Subgenus COSTELLARIA Swainson.

##### *Mitra* (? *Costellaria*) *nodocancellata*, sp. nov.

Plate xv, Fig. 14.

Shell small, dark brownish or dingy purple outside, dark blackish purple, glazed in the mouth; slender, rather obtusely elongated, cancellately sculptured throughout, except on the lower part of the basal whorl near the aperture. Number of whorls five, slightly convex. The three following the nuclear show three, the penultimate four and a partial fifth, and the basal whorl nineteen to twenty prominent revolving liræ; these are traversed by numerous equally prominent longitudinal ribs, thus cancellating the surface quite equally, and forming at the

several points of crossing a bead-like nodule. The sutures are distinctly defined, and interrupt the longitudinal sculpture. The aperture, somewhat less than half the length of the shell is narrow, slightly sinused and calloused above, where the outer lip joins the body whorl, suggestive of *Mangilia*, which the shell as a whole much resembles. The outer lip is thickened and crenulated within; the columella is marked by four obtuse, curved plaits, the posterior being the largest. The dimensions of the single example in the U. S. National Museum collection (No. 55490), which is in good condition, are as follows:

Longitude of shell 10<sup>mm</sup>; of aperture 4.25<sup>mm</sup>; maximum diameter 3.25<sup>mm</sup>.

HABITAT.—Gulf of California, where it was collected by Mr. W. J. Fisher.

This well characterized little shell has much the same plan of sculpture as *Mitra styria* Dall, of the Antillean region (73 to 333 fms.), the nodular sculpture at the points of intersection being more conspicuously and uniformly developed in the form herein described. In other respects, save generic affinity, there are no features in common in the two species.

## Order TELEODESMACEA.

### Suborder CARDITACEA.

#### Family CARDITIDÆ.

Genus **VENERICARDIA** Lamarck.

*Venericardia barbarendis* sp. nov.

Plate XVI, Figs. 3, 4.

Shell rounded, inequilateral, variable in outline, more or less oblique, moderately convex. Beaks small, slightly elevated and turned forward. Surface ornamented with nineteen to twenty radiating ribs usually somewhat granulose, and generally obscure on the extreme anterior and posterior margins of the valves. Epidermis a dingy yellowish brown, thicker towards the ventral margin and sides of the valves; thin and commonly eroded at or towards the umbos. Lunule small, slightly sunken, faintly defined. Hinge line small, not thick; hinge composed of, in the left valve, a single strong cardinal sloping posteriorly and a smaller tooth often obscure, slanting anteriorly; a third tooth-like process is generally present, situated under and apparently a projection of the edge of the lunule. This latter varies much in prominence in different specimens, and is often but barely perceptible. The hinge in the right valve is characterized by a single strong cardinal tooth with a slanting, somewhat sinuous groove above, and a slight notch and tooth-like point below the upper part of the lunule; this latter character

is frequently inconspicuous and feeble. The valves are rather thin and somewhat translucent, bluish white on the inside and showing the ribs when held up to the light.

Dimensions: From umbones or beaks to opposite edge 15<sup>mm</sup>, from anterior to posterior edges 15<sup>mm</sup>, varying the fraction of a millimeter in either or both of these dimensions in different individuals.

HABITAT.—Station 2840, off Station Barbara Islands, California, in green mud at 276 fathoms depth; U. S. Fish Commission steamer *Albatross*, May 8, 1888. Very abundant; several hundred specimens were obtained (U. S. National Museum, No. 104045).

A comparison of this shell with Gould's *ventricosa* (Pl. XVI, Figs. 5, 6), shows not only a great difference in the elevation of the beaks and form (outline) of the valves but in the characters of the hinge, as well as the thickness of the hinge plate. In *ventricosa* as well as in *borealis* and *Miodon prolongatus* the long solid posterior cardinal is strikingly conspicuous when compared with the same in *barbarensis*, which is much shorter, slighter, and without curve; the anterior cardinal is solid and thick with a somewhat diverging curve (*i. e.*, *curving away*) from the posterior cardinal. In *prolongatus* and *borealis* the anterior cardinal is triangular and solid and *perpendicular* to the point of the umbos, or nearly so, with a hint in *borealis* of cleavage in said tooth, while in *barbarensis* this tooth is acutely elongated and sinuously ovate and diverging anteriorly. Both *ventricosa* and *borealis* exhibit a small rounded tuberculoid process anterior to the anterior cardinal, rather inconspicuous, and quite likely absent in some cases. This tubercle is *submarginal* in these two species, and altogether absent in Carpenter's shell *prolongatus*, if we may judge by the example figured (Pl. XVI, Figs. 7, 9); while in *barbarensis* this character is seen to be, as elsewhere remarked, a simple *projection of the edge of the shell* at the base or lower margin of the lunule, varying in prominence, as before remarked, in different individuals.

Venericardia borealis Conrad.

Plate XVI, Fig. 8.

This form was described by Conrad on page 39 of his American Conchology, of which only a few parts were published, and a figure given, which shows the exterior of the right valve and an upper inside portion of the left, with the hinge, the latter not as definitely figured as is desirable. The description is quite brief and unsatisfactory when compared with Dr. Gould's in the Invertebrata of Massachusetts, wherein *Arcturus rudis* Humphrey MS, and *Cardita vestita* Deshayes, are included as synonyms. It is common in many places on the Atlantic sea-board, off shore, at various depths, from the Arctic sea to Hatteras, at from 5 to 100 fathoms. Say's *granulata*, and Morse's *novangliæ*, which Mr. Dall regards as varietal forms,\* imply differences or

\* Vide Bulletin 37, U. S. National Museum, p. 46.

aspects in sculpture and outline, analogous to the various facies exhibited by the same species on the Pacific side. Professor Verrill makes Conrad's name a synonym, and gives Say's *granulata* priority, and regards the form, which Morse named *novangliæ*, "as a mere variation\* of this common and variable species," etc. Gould says "*vestita* is an elongated middle-aged variety;" and further, in comparison, *C. tridentata* Say, differs from *borealis* in the hinge, the latter having "two teeth in the right valve, while that shell (*tridentata*) has but one."

The form familiarly known by Conrad's name is common in the northern part of the two great oceans that bound the continent, and, with its varieties, may be regarded as circumpolar.

*Venericardia ventricosa* Gld.

Plate XVI, Figs. 5, 6.

The figures given herewith were made from Dr. Gould's type, now in the National Museum (No. 3373), which is also figured and described (July, 1850) in the "Exploring Expedition" volumes. It was detected in Puget Sound. Dr. Carpenter, in discussing the Expedition shells in his Supplementary Report to the British association (Smithsonian miscellaneous collections No. 252, reprint, *vide* page 17, as indexed), says: "[Appears to be a local variety of the ancient Miocene species, *Venericardia borealis* + *C. occidentalis* Cour. + *C. subtenta* Conr. (fossil) probably.]"

Conrad described his *C. occidentalis* from a fossil example collected at Santa Barbara, by Dr. Newberry, in the Proceedings of the Academy of Natural Sciences, of Philadelphia, December, 1856, without a figure. The latter is given only an exterior view, however, in Volume VI of the Pacific railroad reports, but minus the description. The figure in the last-named volume, so far as it goes, may be applied to Gould's species, but not without doubt, as a knowledge of the hinge characters is absolutely necessary in the forms of this group to make determination possible. Conrad's description in the Philadelphia Proceedings is so meager and general as to be of no value whatever, and is really without any title or claim to consideration for this reason. In his description he says that it is allied to "*C*—, of the San Pedro recent formation," etc., which is about as valueless a reference for the purposes of comparison as can well be imagined.

Upon looking up the *subtenta* of Conrad, we find it among the Astoria (Oregon) fossils described in Volume X of the "Exploring Expedition," App. I, page 726, 1849. Carpenter refers to it thus on page 679 of his supplementary report (p. 165 of reprint): "*Cardita subtenta*, Conr., = *Venericardia borealis* Conr.," but in this as with *occidentalis*, the description furnishes no light of a definite character. The dimensions as

\*Verrill's Second Catalogue of Mollusca, etc., Trans. Conn. Acad., 1884, p. 258.



given by Conrad are, "length and height three-fifths of an inch, thickness two-fifths of an inch." The figures (Pl. 18, Figs. 12, 12a, atlas) show only the exterior of the specimen, and are about the same in size and other respects as that of *C. occidentalis*, before mentioned, so that while Carpenter's inclusion of these imperfectly described fossils as synonyms of *borealis* may be right, it will be seen from what I have stated as the result of my search and examination of Conrad's description, such an association of these specific names is altogether presumptive and simple guess-work.\* It will be seen also, upon recurring to my first quotation from Dr. Carpenter, that he regarded *ventricosa* as a local variety of *borealis*, but a comparison of the hinge characters as shown in the figures is sufficient to settle the question. The cardinal tooth in *ventricosa* (left valve) as figured, it will be seen, is short and curved towards the lunule, while in *borealis* it is triangular, obtusely wedge-shaped and grooved, hinting at cleavage or forking, as previously indicated. Examples varying in size from 37<sup>mm</sup> from beaks to ventral margin, and 37.50<sup>mm</sup> in the opposite direction, to those measuring 11.50<sup>mm</sup> from beaks to ventral margin, and 11.25<sup>mm</sup> in the other direction, exhibit this character, the larger individual (Museum No. 74194) being from the neighborhood of the Aleutian Islands, Alaska, and the smaller (Museum No. 73455) from 30 fathoms near Catalina Island, in the Santa Barbara channel. The identity of the latter is further confirmed by Dr. Carpenter's initials on the label.

Genus **MIODON** Cpr.

**Miodon prolongatus** Cpr.

Plate XVI, Figs. 7, 9.

This subgenus and species were described by Philip Carpenter in the *Annals and Magazine of Natural History* (third series), Vol. XIV, December, 1864, p. 424. The author made this subgeneric term to cover and include, as he says, certain "species intermediate in character between *Astarte*, *Venericardia* and *Lucina*. It first appears in the great Oolite, where it is represented by *Astarte* (*Miodon*) *orbicularis* J. Sby., *Min. Conch.*, Pl. 444, Figs. 2, 3. This must not be confounded with a second and true *Astarte orbicularis* by the same author, Pl. 520, Fig. 2. It appears in Mr. Searles Wood's Crag-series as *Astarte corbis*."

The form described by Carpenter as above is the only recent species known.

Several specimens are contained in the National collection, including No. 15742, from Neeah Bay, and Mr. Dall obtained several examples in the Alaskan region at Middleton island.

\* Gabb (*Paleont. Cal.* II, p. 100) unites under the name of *C. ventricosa* Gld. the *subtenta* and *occidentalis* of Conrad and his own *C. moulicosta*. The very imperfect types of the fossils in the U. S. Nat. Museum indicate that this may be a correct conclusion, though all that we can positively assert in regard to the fossils is that they are certainly not *C. borealis*.

It is a small shell, the dimensions of the type, as stated by Carpenter, being "long. .23, lat. .24," and the diameter or thickness .16 of an inch. The shell is figured above for the first time.

The varied and striking forms of the *Carditidæ* are conspicuously represented on the western coasts of North and South America from the subarctic waters of the Alaskan region as far to the south as Valparaiso in Chili.

While some are globose and heart-shaped like the typical cockles (*Cardium*), others are exceedingly transversely elongated, and these extremes are connected by intermediate forms.

Of the cockle-shaped group, of which the commonly figured *C. sulcata* Lamarck may be regarded as an average illustration, we find the following in the monographs credited to the Pacific shores of the two continents: *C. Cuvieri*, the monarch of the group, with the varied and peculiar *C. flammea* Mich., of which the *C. varia* and *C. tumida* of Broderip are synonyms; *C. crassa* Gray and *C. laticostata* Sby, these two rather intermediate and between the elevated umbonal and the more elongate forms. While the extreme cockle-shaped forms in the elevation and development of the umbones, as exhibited in large examples of *C. flammea*, approach *Isocardia*, yet the opposite extreme of transverse elongation is gradually approached, and these two remote aspects of shell characters connected, as may be seen when the general group is reviewed as a whole.

Following the more rotund, the suborbicular species of the *Venericardia* fall into place, represented by Conrad's *borealis*, Gould's *ventricosa*, and my *barbarensis*, as above described, and certain small forms, dwarfs or adolescents, perhaps extra-limital aspects of the several facies of *borealis* figured and named by Reeve (*Conch. Icon.*, Pl. IX) as *C. compressa*, *flabellum*, and *semen*; the first and second from Valparaiso, the third from the Bolivian coast, all small, insufficiently described, and imperfectly figured. In addition to these is *C. tegulata*, a small shell also in Reeve in the plate cited; it is coarsely ribbed, and in outline resembles *flabellum*. Carpenter's *prolongata* comes in here, a little oblique shell with high umbones, and there are varieties of *borealis*, small and semi-globose, with granulose ribs. The granulation of the ribs and elevation of umbones are varietal or local features, perhaps both. *C. borealis* Conrad is figured here (Plate XVI, Fig. 8) for comparison with the other species above noted.

The transverse shells of the group *Carditamera* (Conrad, 1838=*Lazaria* Gray, 1853) includes the following:

*C. pectunculus* Brug., 1790; *C. affinis* Sby., 1832; and *C. californica* Desh., 1852. The first has been credited to Madagascar,\* no doubt erroneously, and so far as I can learn said habitat has never been confirmed. A large example of *C. californica* which I have in my hand at the moment of writing this, fits exactly to the figure in every way

\* Reeve's *Conch. Icon.* species 4, and Fig. 4, Pl., 1.

and furthermore agrees in every respect with the description. *C. pectunculus* is included in Lister's Conch. Hist., Oxoniæ, 1770, Pl. 347, Fig. 185, and is the *Chama pectunculus* of Dillwyn, etc.

*C. californica* is nothing more than a varietal form of *affinis*, and the alleged distinctions fade away or blend gradually when a large series are placed side by side for comparison.

A form nearly related to the foregoing and closely resembling individuals of the *affinis-californica* aspect is the *C. radiata* Brod. (1832), in Reeve's Monograph, Pl. 1, Fig. 5, collected at Panama and elsewhere along the coast of the same general region. Two specimens in the National Museum (No. 15906) were determined by Cuming as this species; one of them, upon careful examination proves to be the common *affinis* of Panama, the other agrees closely with Reeves's figure, above noted, in form, color, etc., as well as with the description.

I should have included it, with perhaps a passing comment, with the other three, had it not had the initials of Mr. Cuming on the label, which led me to scrutinize it closely. There is a difference in the shape and direction of the central cardinal tooth in the left valve, which, if varietal, is certainly rather an unusual aspect of variation, and may be regarded more properly as abnormal, if the many other characters which connect with the forms previously named should be allowed to outweigh this single differential feature.

Carpenter's little "*Lazaria subquadrata*," of the upper Californian province, comes in here. It is an interesting form, combining the coarse exterior ribbing and aspect of the *laticostata* group, with the hinge characters of *Carditamera*.

The peculiarly interesting form upon which Mr. Dall has made the genus *Milneria*, with one species, *minima*, completes the list of West American *Carditas*, which may be summarized as follows:

*C. Cuvieri* Brod.

*C. flammea* Mich., + *C. varia* Brod., + *C. tumida* Brod.

*C. crassa* Gray.

*C. laticostata* Sby., + *C. tricolor* Sby.

*C. (Fenericardia) ventricosa* Gould, + ? *C. occidentalis* Conr., + ? *C. subtenta* Conr., the last two fossils.

*C. (Fenericardia) borealis* Conr.

*C. (Fenericardia) barbarensis* Stearns.

*C. (Miodon) prolongatus* Cpr.

*C. (Carditamera) pectunculus* Brug., + *affinis* Sby., + *californica* Desh.

*C. (Carditamera) subquadrata* Cpr.

*C. (Milneria) minima* Dall.

Doubtful and imperfectly described or figured, perhaps in some instances synonyms of the foregoing.

*C. monilicosta* Gabb.

*C. (Fenericardia) compressa* Rve., ? = *borealis* Conr.

*C. (?) Fenericardia) flabellum* Rve.

*C. semen* Rve.

*C. tegulata* Rve.

*C. (Carditamera) radiata* Brod. ? = *pectunculus* var.

The subgeneric distinctions made in the *Venericardia* group by Conrad are simply frivolous and uncalled for. The intimate relationship of forms like *borealis*, *ventricosa*, *tridentata* and *barbarensis*, are apparent at a glance, and the differences upon which these distinctions are based, as in *Cylocardia* and *Pleuromeris*, are of no greater than specific value. It is highly probable that this criticism might with propriety be extended to other related genera, which have been admitted and perpetuated in conchological literature.

### Suborder LUCINACEA.

#### Family LUCINIDÆ.

Genus **LUCINA** Bruguière.

**Lucina æquizonata** sp. nov.

Plate XVII, Figs. 3, 4.

Shell moderately convex, dull white chalky where eroded; epidermis of a dull dingy light yellowish tinge, finely wrinkled in old specimens, and inclined to be deciduous and slightly flaky or ragged; in young shells, translucent, shiny, and nearly colorless. Valves transversely ovate, being broader than high; the posterior side is abruptly squarish, and the dorsal line slants gradually from the umbones; on the anterior side the dorsal outline is moderately concavely curved away from the beaks, and in young and perfect specimens a very slight angulated pinch may be seen extending from the lunule to the anterior edge of the valves. The beaks or umbones are small, inclined towards the lunule; the lunule is quite narrow, attenuately lanceolate and elongated. Surface of valves transversed with fine concentric growth lines, and prominent rather regularly spaced thread-like ridges. Hinge line curved and showing two diverging cardinal teeth in each valve; the anterior one in the left valve, and the posterior one in the right valve, notched or partially cloven. Elongated, tuberculoid lateral teeth in both valves at extreme limit of dorsal or hinge line. Dimensions: From beaks to ventral margin, 37.50<sup>mm</sup>; from anterior to posterior edges of valves, 46.25<sup>mm</sup>. Individuals otherwise of same dimensions vary much in rotundity; two examples measure, the one 21.75<sup>mm</sup>, the other 17.75<sup>mm</sup> diameter or thickness.

**HABITAT.**—Off Santa Barbara Islands, California, in green mud in 276 fathoms May 8, 1888, U. S. Fish Commission, Steamer *Albatross*, common (fifty specimens), Museum No. 104044.

In Stimpson's *Lucina filosa* (Museum number 92679, see Plate XVII, figures 5, 6), there are *no lateral teeth*, and the valves are more nearly orbicular in outline. In *L. borealis*, the European form, to which Carpenter assigned the specimens dredged by Dr. Cooper near the islands in the Santa Barbara Channel (30 to 120 fathoms), there is an inconspicuous anterior lateral discernible *in the right valve, but no posterior lateral*.



In *filosa* and *borealis* the cardinal teeth in form, position, and angle are very nearly or quite alike.

In *L. jamaicensis*, of the same group, the laterals are conspicuous and strong; the cardinals inconspicuous, the anterior lateral in the right valve prominent and stumpy, the posterior lateral in the same valve elongated, ridge-like. The surface sculpture in *filosa*, *borealis*, and *jamaicensis* differs each from the other; the texture of the shells in these species also varies, the two latter having a much firmer and compact and porcellanous aspect than *filosa*, and *filosa* having a firmer texture than the Santa Barbara form, which latter has a surface aspect in the matter of texture much nearer to *L. lamellosa* Smith. The latter is a somewhat tumid and angulated form from the Straits of Magellan, and has a rather rounded tuberculoid lateral on the anterior side of the valves.

The anterior dorsal region, it will be seen by looking at the figures, is markedly different in Stimpson's *filosa* from *acuzonata*.

### Suborder VENERACEA.

#### Family VENERIDÆ.

#### Genus VENUS Linn.

#### Subgenus CHIONE Megerle.

#### Venus (Chione) effeminata sp. nov.

Plate XVII, Figs. 1, 2.

Shell triangularly transversely ovate, the anterior outline rounded, the posterior more elongated and obtusely angulate. The proportions of the shell are as follows: Three-fifths of the length are posterior to a (perpendicular) line drawn from the umbones to the ventral margin; the height of the shell on said line as compared with the length is as four to five.

The valves are moderately convex, and the surface is prettily and evenly cancellated by forty-five to fifty rounded ribs radiating from the beaks and divided by grooves of nearly the same width as the ribs; both ribs and grooves are crossed by thirty to thirty-five or more sharp, elevated, concentric, thread-like striae, so fine at the beaks as to be scarcely discernible. Color whitish, purplish in the umbonal region. The beaks are pink, sharp, proximate, and turned towards the lunule, which latter is ovately cuneiform and distinctly defined. The ligamental area is narrow, elongated, somewhat excavated, and slightly keeled. Interior of valves rosy purple and crenulated on the edges from a point about midway up the anterior margin to a similar point on the opposite end, the crenulations peculiarly sharp and squarely cut.

Hinge plate moderately thick; the right valve exhibits two strong and one upper thin elongated subsidiary tooth, just under and parallel

to the edge of the lunule; of the principal cardinals one is acutely triangular or wedge-shaped and slopes posteriorly, the other is elongately triangular, somewhat curved and prolonged anteriorly and below the subsidiary tooth. Between the principal cardinals is a triangular pit into which the central cardinal of the left valve fits; the left valve also exhibits a slender elongated tooth on each side of the principal, cardinal, which fit into corresponding grooves in the right valve. The muscular scars are large for so small a shell, and the pallial impression is broad and shiny and considerably back from the edge of the valves, and the sinus moderately deep and rounded, its upper edge curving to and touching the lower part of the posterior adductor impression.

Dimensions: From beaks to ventral margin, 10<sup>mm</sup>; from anterior to posterior edges, 13<sup>mm</sup>.

HABITAT.—Panama Bay, where it was collected by the late Thomas Bridges.

This little shell, now belonging to the U. S. National Museum (No. 102181), was received by the author many years ago with the remains of the Bridges collection of mollusks; it has not been described heretofore for want of access to the literature and material necessary to determine the fact of previous description or the reverse. It is a strongly characterized form, with every aspect of maturity, and quite distinct from any of its nearest allies.

## Order ANOMALODESMACEA.

### Suborder ANATINACEA.

#### Family ANATINIDÆ.

#### Genus **PERIPLOMA** Schumacher.

#### **Periploma discus** sp. nov.

Plate xvi, Figs. 1, 2.

Shell thin, fragile, white, translucent, seminacreous; inequilateral, nearly circular, being posteriorly subangulated and flexuously squarish and produced; inequivalve, the left valve being more ventricose than the right; valves somewhat gaping; pallial impression, narrow, shiny, distinct; sinus rather deep and rounded interiorly and curving up to the adductor scar; beaks small, nearly central, fissured; hinge a hollowed spoon-shaped process (projecting inwards from below the beaks), which holds the cartilage; this spoon-shaped cartilage cup or process is strengthened by an elongated callus slanting anteriorly; the exterior surface of the valves is finely wrinkled and linearly scabrous (more easily seen by holding a valve up to the light) and otherwise marked by concentric lines and zones of growth.

Two specimens are contained in the National collection (Museum No. 105391), the largest of which measures from the beaks to the ventral margin or edge 36<sup>mm</sup>, from the anterior to the posterior edges in the broadest place 41<sup>mm</sup>, and the thickness or diameter is 14.50<sup>mm</sup>.

HABITAT.—San Pedro, Long Beach, etc., Los Angeles County, California; Mrs. M. Burton Williamson and others.

This is an unusual form for a member of the *Anatina* group, and quite distinct from any of the West coast representatives of the family heretofore described.

The *Anatina* (*Periploma*) *alta* C. B. Ad. (Panama shells, p. 294), described from a single valve, is a transverse form, the measurements as given by the author being as follows: "Length, 1.98; height, 1.35; breadth 0.7 inch.," or nearly seven-tenths (0.67) of an inch more from the anterior to the posterior margin than from the beaks to the ventral or opposite edge of the shell.

This should not be confounded with *P. alta* Conrad (Proc. Acad. Nat. Sci. Phila., p. 585, 1862, Am. Journ. Conch. II, p. 70, pl. 4, fig. 10, = *P. peralta* Conr., Am. Journ., Conch. iii, p. 188, Sept., 1867), from the Miocene of New Jersey, which is a rounded form not unlike *P. discus* in general appearance.

*Periploma excurva* Cpr. is also a transversely elongated form, though less inequilateral than the foregoing, and measures, as quoted, "long. 2.06; lat. 2.46; alt. 1.05 poll."

*Periploma papyracea* Cpr., described by the author from one "perfect valve and a broken pair displaying the hinge *in situ* are all that is known of this beautiful species. It differs from the others in its outline, the greater part of which is suborbicular, with a short broad beak."

The dimensions are given as "long. 0.78; lat. 1.06, alt. 0.42 poll."

*P. excurva* and *P. papyracea* are both described on page 229 of the Proceedings Zoölogical Society of London, with many other forms "principally in the collection of Hugh Cuming." *P. papyracea* is, it will be seen, somewhat more equilateral than *P. excurva*, yet much less so than *P. discus*.

In Carpenter's British Association Report (1856), on page 287, he erroneously refers to *P. excurva* as "*P. excurvata*." *Periploma argentaria* Conrad is the name usually given to the commonest of the west American species; it was described by the author in 1837.\* Dr. Gould regarded the shell described by Conrad as the same to which Sowerby had given the name of *planiuscula* in 1834.† In the same place Sowerby has described still another species, *P. lenticularis*, from the island of Murte, which is in the Bay of Guayaquil, about 3 degrees south latitude. The examples of *P. planiuscula* described by Sowerby were collected at St. Elena, a point on the northerly boundary of the same gulf, and both of these species by Cuming. Carpenter makes no allusion to *lenticularis*

\* Jour. Phila. Acad. Nat. Sciences, Vol. VII. Part II, 1837, p. 238., Pl. 18, Fig. 8.

† Proc. Zool. Society London, 1834, p. 87.

in either of his reports to the British Association, probably for the reason that its habitat was exterior to the geographical limits covered by said reports, or south of the range of coast covered by his investigations. His reference to *planiuscula* was no doubt owing to Dr. Gould's opinion of its identity with Conrad's *argentaria*.

If my conclusions, resting upon a careful consideration of the descriptions published, as well as a comparison of the figures when given, and further upon diagrams carefully worked out from the measurements as published where figures are lacking, are correct, it is altogether certain that the number of species as alleged must be greatly reduced. With the dominant West American form and its varied aspects I am perfectly familiar, having seen and handled a large number, as well as collected it, and of the identity of the forms described by Conrad and Sowerby I have no doubt. Though Conrad's *argentaria* is the most familiar name and in general use, and again more appropriate than Sowerby's *planiuscula*, yet, as a matter of fact, the latter's has priority by three years. It is highly probable, hardly a doubt, that Hauley's *obtusa*, C. B. Adams' *alta*, Carpenter's *excurva*, and Sowerby's *lenticularis* all fall to the rear as synonyms. Conrad's *Leana*, included by Carpenter in the Smithsonian checklist of the shells of the west coast of North America, must be eliminated, as it is an East North American form described by the author\* from a Rhode Island specimen. A revised list of the West American species will read thus.

1. *Periploma planiuscula* Sby.  
   + *P. lenticularis* Sby.  
   = *P. argentaria* Conr.  
   = *P. alta* C. B. Adams.  
   = *P. excurva* + *P. excurvata* Cpr.
2. ? *Periploma papyracea* Cpr.
3. *Periploma discus* Stearns.

Of the above, 1 and 3 occur in what Carpenter has termed the "Oregonian and Californian Province," and 1 and 2 in his "Mexican and Panamic Province." They are however rather southern than northern shells, and I am not aware of their occurrence north of Point Conception.

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\*Jour Acad. Nat Sciences, Phila., VI. 263, Pl. 11, Fig. 11.



## EXPLANATION OF PLATES.

NOTE.—As the figures of the plates are amplified or reduced from the natural size in proportions which are not the same for all the figures, in the explanation to the plates, after the name of the species, the actual height or length of the specimen figured is given in millimeters.

## PLATE XV.

- FIGS. 1, 4. *Holospira semisculpta* Stearns; lon. 23.0<sup>mm</sup>; p. 208.  
2, 3. *Holospira arizonensis* Stearns; lon. 13.0<sup>mm</sup>; p. 208.  
5, 10. *Capulus (Cyclothyca) corrugatus* Stearns; alt. 3.0<sup>mm</sup>; p. 212.  
6, 7, 8. *Helix (Arionta) coloradoensis* Stearns; max. diam. 15.25<sup>mm</sup>; p. 206.  
9. *Melania (? Goniobasis) acutiflora* Stearns; alt. 16.5<sup>mm</sup>; p. 211.  
11, 12, 13. *Helix (Arionta) magdalenensis* Stearns; max. diam. 12.5<sup>mm</sup>; p. 207.  
14. *Mitra (? Costellaria) nodocancellata* Stearns; alt. 10.0<sup>mm</sup>; p. 213.

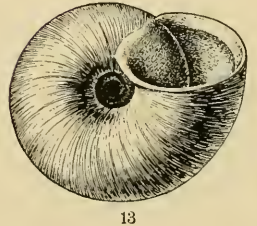
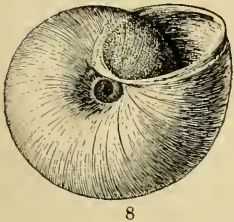
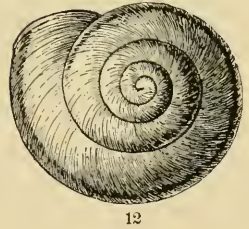
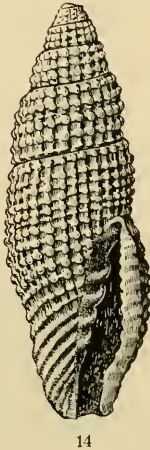
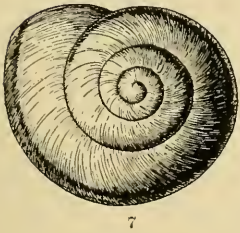
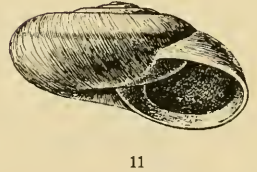
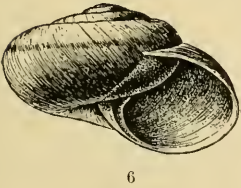
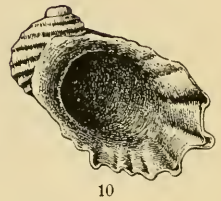
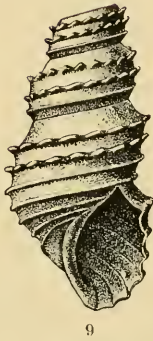
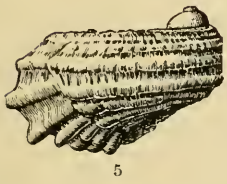
## PLATE XVI.

- FIGS. 1, 2. *Periploma discus* Stearns; lon. 41.0<sup>mm</sup>; p. 222.  
3, 4. *Venericardia barbavensis* Stearns; lon. 15.0<sup>mm</sup>; p. 214.  
5, 6. *Venericardia ventricosa* Gould; inside and outside view of type specimen; alt. 15.0<sup>mm</sup>; p. 216.  
7, 9. *Miodon prolongatus* Carpenter; inside and outside view of typical specimen, from Middleton Island, Alaska; alt. 5.0<sup>mm</sup>; p. 217.  
8. *Venericardia borealis* Conrad; inside view; lon. 33.0<sup>mm</sup>; p. 215.

## PLATE XVII.

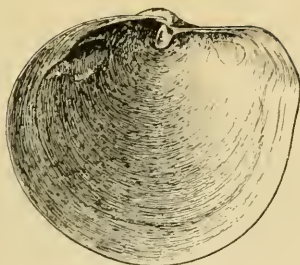
- FIGS. 1, 2. *Chione effeminata* Stearns; lon. 13.0<sup>mm</sup>; p. 221.  
3, 4. *Lucina aquizonata* Stearns; lon. 46.25<sup>mm</sup>; p. 220.  
5, 6. *Lucina filosa* Stimpson; lon. 40.0<sup>mm</sup>; p. 220.



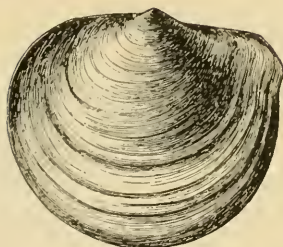




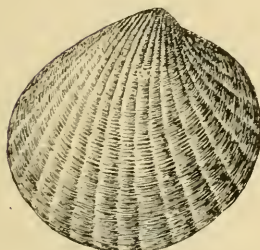




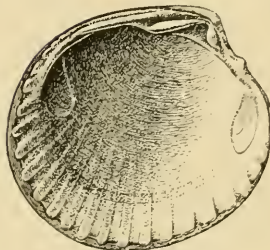
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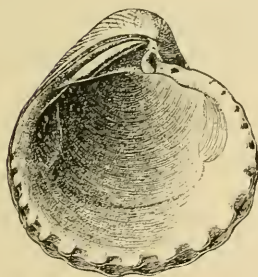
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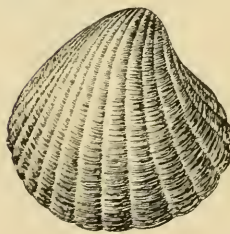
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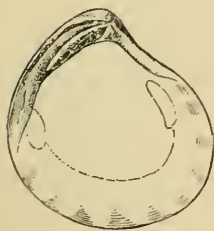
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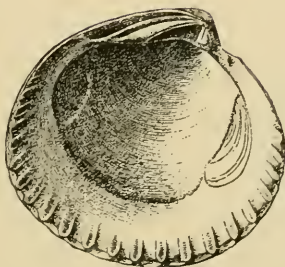
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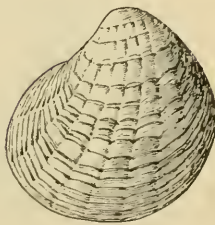
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