

AN ANNOTATED LIST OF THE SHELLS OF SAN PEDRO BAY AND
VICINITY.

BY

MRS. M. BURTON WILLIAMSON.

WITH A DESCRIPTION OF TWO NEW SPECIES BY W. H. DALL.

(With Plates XIX-XXIII.)

I have often thought if the fauna and flora of every inhabited county in the United States were studied and reported by careful, conscientious lovers of nature, the contributions to the natural history of our country would be of no small value, not only as a record of the riches of nature but, at a future time, as a history of the life that at a certain period was identified with a particular locality. For there is nothing permanent in nature. Her activity begets change, and change daily makes history.

With these thoughts in my mind I have undertaken to give a list of the marine shell fauna of Los Angeles County found, for the most part, within a period of two years. I am indebted to Mrs. L. H. Trowbridge and Miss I. M. Shepard for lists of shells found by them. Some of their shells have been identified, through me, by Dr. J. G. Cooper, but the greater part, especially the rarer forms, have been determined at the Smithsonian Institution, Washington, D. C. Miss S. P. Monks, teacher of drawing and zoology in the State normal school, in Los Angeles, has kindly allowed me to examine the shells found by her as well as those in the museum of the normal school.

There are still some shells that have not been identified.

The *Nudibranchiata* are not included in this list. *Doris* and *Eolis* have been found in San Pedro Bay and at Catalina Island, but not specifically determined.

INTRODUCTORY.

The coast of Los Angeles County is diversified by two large bays, Santa Monica and San Pedro, with their long sandy beaches separated by high, rocky cliffs. On the northwestern coast of the county the Sierra de Santa Monica range of mountains rises abruptly from the ocean. The extreme western point in this range is known as Point Dume, noted for its diatomaceous earth. Running back from this point the coast curves in until it reaches the sandy beach of Santa Monica Bay. In this bay *Tivela crassatelloides* and *Tapes staminea*

are most abundant. A lagoon, known as Ballona Harbor, lies between Santa Monica and Redondo Beach. The latter is noted more for its pebbles than shells. South of Redondo is a long line of mountainous foothills that rise abruptly from the ocean. These foothills, with their mesas, are known as the Palos Verdes Hills. The rocky cliffs of the hills are called "points" where a trail down their sides makes it possible to descend to the beach below. One of these points, about seven miles south of Redondo, is called Point Vincente, where at low tide the *Haliotis Cracherodii* with other rock shells are found. Portuguese Bend, with its cave in the solid rock running nearly 100 feet under the cliff, lies about two miles south of Point Vincente. Out from this cave, whose stone floor is daily and almost hourly mopped by old ocean, the rocks at low tide lie uncovered for some distance on the beach. This is especially so at low tides in the winter, when our beautiful *Haliotis fulgens* (or *splendens*) is collected. The *Lottia gigantea* is most abundant at this point. From Portuguese Bend, Whites Point and Point Fermin (the light-house) are distinctly visible as they extend out into the ocean. Whites Point was at one time noted for its *Haliotis Cracherodii*, but continuous collecting has almost despoiled it of these shells. Point Fermin lies almost two miles south of Whites Point. Here as well as at the latter point *Chlorostoma* and *Acmæa* are plentiful. Between Point Fermin and San Pedro Bay is the pier known as the "old landing." Timms Point, in the bay, is a small, flat sand bar that lies below the western part of the city of San Pedro, which is built on the cliffs above the bay. *Bulla nebulosa* and *Liocardium substriatum* are found at Timms Point, near the oyster bed. Across from the town of San Pedro, in the bay, are two little islands that are connected by a long wall of stones known as the "breakwater." This breakwater is $1\frac{1}{4}$ miles long. Dead Man's Island (and any one who has read Dana's "Two Years Before the Mast" can conjecture why the island is so named) is little more than a miniature promontory of stone, with sandy soil on the summit. Around the top of this island, in the loose, sandy soil is a bed of Quaternary (or Postpliocene) fossil shells.* These shells are continually being washed out, and, falling below, they lie in the rock pools in company with the living shells. The breakwater that connects Dead Man's Island with Rattlesnake Island is the home of the *Acmæa* and *Chlorostoma*. Rattlesnake Island is one long, sinuous sand bar, destitute of vegetation, and in its widest part hardly more than a quarter of a mile across. Some of our rarest shells are found washed ashore in the drift on this island. Here on the bay side are *Chione* and *Cerithidea* as well as in the slough that lies between the towns of San Pedro and Wilmington. Between the latter and the town of Long Beach the San Gabriel River empties into the bay.

*At the base of this island are rocks that belong to the Pliocene and possibly Miocene strata, and many fossils of these older formations are washed out of the rocks by the ocean, and are collected with recent shells on the beach.

Long Beach supplies *Donax californicus*, a favorite clam for soup. At low tide the long, sandy drive on the strand between Long Beach and New River, a fork of the San Gabriel, is diversified by a small pile of soft rock, known as Devil's Gate, where a few rock Pholads are found. At the extreme south of San Pedro Bay is Alamitos, at the mouth of New River. Here are *Crepidula*, *Cerithidea*, *Melampus*, and *Pecten*. Laguna Beach, the home of *Trivia*, is 30 or 40 miles south, but in the recent division of Los Angeles County this beach was apportioned to the new county of Orange.

About 25 miles out in the Pacific Ocean is a little island, one of the Santa Barbara Islands, known as Santa Catalina. This mountainous stretch of land is included in Los Angeles County. This island is almost 27 miles long, and from 4 to 8 miles wide save at the isthmus. It is "chiefly metamorphic rock," and the beach is composed wholly of pebbles; many of these are a pure white. Collecting is confined to the small beaches that border the narrow valleys between the precipitous hills. *Haliotis* and *Lucapina crenulata* are found in the winter. In summer collecting is poor. Mr. Dall says, "The gravelly shores of Catalina Harbor on the south side are rich in small species."

In the following list, where the name of the bay is not given, San Pedro is intended.

The author gratefully acknowledges the assistance she has received through the kindness of Mr. William Healey Dall, Dr. Robert E. C. Stearns, and Mr. Chas. T. Simpson, of the Smithsonian Institution, and J. G. Cooper, M. D., of the California Academy of Sciences, in the determination, with notes, of a number of shells. The species so identified are, in each instance, noted by the initials in brackets of the gentleman to whom the species was referred. Mr. Dall has also kindly advised her relative to many changes in nomenclature.

(W. H. D.)—Mr. William Healey Dall, National Museum.

(R. E. C. S.)—Dr. Robert E. C. Stearns, National Museum.

(C. T. S.)—Mr. Charles Torrey Simpson, National Museum.

(J. G. C.)—J. G. Cooper, M. D., California Academy of Sciences.

The shells on the list identified at the Smithsonian Institution by Mr. Simpson were for the most part collected by Miss Shepard.

The number of southern shells lately added to the fauna of this vicinity is so great that some suspicion has been aroused as to the possibility of some of them being adventitious, but they are included in order that the question as to their provenance may be kept in view, and in time definitely settled by the collection of living specimens.

UNIVERSITY, P. O., LOS ANGELES COUNTY, CAL., December, 1890.

[NOTE.—In advance of a general revision of the classification of the Californian mollusk-fauna it has been thought most convenient in this list to retain the familiar arrangement of the late Dr. Carpenter.—W. H. Dall.]

LIST OF SPECIES.

BRACHIOPODA.

Family LINGULIDÆ.

Genus **GLOTTIDIA** Dall.**Glottidia albida** Hinds. (*Lingula albida*, of authors.)

Found in the drift on the beach.

Family TEREBRATULIDÆ.

Genus **TEREBRATELLA** Orb.**Terebratella transversa** Sby.

Seldom found alive. "This is the light-colored southern variety; the northern ones are much larger and duller. *T. occidentalis* is very like this, but has the fold in the middle line of the shell convex, while in *transversa* it is concave in the smaller valve." (W. H. D.)

MOLLUSCA.

Family PHOLADIDÆ.

Genus **ZIRPHÆA** Leach.**Zirphæa crispata** Linn.

Seldom collected alive; separated valves common. At Bolinas Bay, near San Francisco, Mr. W. J. Raymond obtained the *Zirphæa* "by digging in soft sandstone with a pick. The burrows are from 12 to 15 inches or more, in depth, and the shells are very fragile. One has to dig a large hole around each specimen before venturing to break into the burrow."

Genus **PHOLADIDEA** Turton.**Pholadidea parva** Tryon.With *P. penita*, dead.**Pholadidea penita** Conl.

A few in the soft rock at Devil's Gate.

Genus **NETTASTOMELLA** Cpr.**Nettastomella Darwinii** Sby.

A few in soft rocks.

Genus **PARAPHOLAS** Conrad.**Parapholas californica** Conr.

Two or three; with the soft parts gone.

Genus **PHOLAS** Linné.

Pholas pacifica Stearns.

Three or four washed ashore with the tide. Single valves not plentiful.

Family **SAXICAVIDÆ**.

Genus **SAXICAVA** F. de Bellevue.

Saxicava arctica Linn.

In algæ; also, with barnacles, at Redondo Beach.

Saxicava arctica, var. *pholadis* Linn.

One example.

Genus **GLYCIMERIS** Lamarck.

Glycimeris generosa Gld.

Rare; as single valves.

Family **MYACIDÆ**.

Genus **PLATYODON** Conrad.

Platyodon cancellatus Conr.

Not plentiful alive.

Genus **CRYPTOMYA** Conrad.

Cryptomya californica Conr.

Live ones at Point Fermin. Sometimes washed ashore in the bay.

Genus **SCHIZOTHÆRUS** Conrad.

Schizothærus Nuttallii Conr.

A few young shells. Single valves only of adults.

Family **CORBULIDÆ**.

Genus **CORBULA** Bruguière.

Corbula luteola Cpr.

A few live ones. Pink ones found on Actinia. "Varies in color to different shades of red, blue, brown and yellow." (J. G. C.)

Family **PANDORIDÆ**.

Genus **CLIDIOPHORA** Cpr.

Clidiophora punctata Cpr.

Single valves, in the beach drift. One live specimen reported by Miss Eleanor B. Green.

Family ANATINIDÆ.

Genus **PERIPLOMA** Schumacher.**Periploma planiuscula** Sby. (*P. argentaria* Conr., of authors.)

Eight or ten living shells. Single valves common. For notes on the specific name of this species, see Stearns's "West American Shells." Proc. U. S. Nat. Mus., XIII, No. 813, page 223.

Periploma discus Stearns.

This new shell, found in San Pedro Bay, is described by Dr. Stearns, as above mentioned, p. 222, pl. XVI, figs. 1, 2.

The first specimen was found by Mrs. D. Garlick, and soon after Miss Shepard and Mrs. Trowbridge found others in the bay. Since that time seven or eight shells have been collected.

Genus **THRACIA** Leach.**Thracia curta** Conr.

Rare; in the bay; dead.

Genus **LYONSIA** Turton.**Lyonsia californica** Conr.

Three or four dead shells. One live example in the drift at Rattlesnake Island, found by Mrs. Emma King.

Family SOLENIDÆ.

Genus **SOLEN** Linné.**Solen ensis** Linné, var. *minor* Conr.

Several collected at Long Beach. (W. H. D.)

Solen rosaceus Cpr.

Washed ashore after storms.

Solen sicarius Gld.

Four or five.

Genus **TAGELUS** Gray.**Tagelus californianus** Conr. (*Solecurtus californianus* Conr.)

Not uncommon in the Bay. "The generic name of the *Solecurtus californianus* and *S. subteres*, of Carpenter's list, is *Tagelus*. The true *Solecurtus* is a different shell." See Bulletin U. S. Nat. Mus. No. 37, p. 58; also, Dall, Report on *Albatross Mollusca* in Proc. U. S. Nat. Mus., Vol. XII, p. 243.

Tagelus californianus var. *subteres* Conr.

Found with the former. Epidermis, when present, very dark.

Genus **SILQUA** Megerle.

Silqua patula Dixon (*Machera patula* of authors).

Three young shells reported from Long Beach.

Family **TELLINIDÆ**.

Genus **SANGUINOLARIA** Lamarck.

Sanguinolaria Nuttallii Conr.

Occasionally found alive.

Genus **PSAMMOBIA** Lamarck.

Psammobia rubroradiata Nutt.

Rare, empty shells only.

Genus **MACOMA** Leach.

Macoma indentata Cpr

When full grown, this species is as graceful as a *Tellina*. Usually found in the immature condition and in this state is very similar to a young *M. secta*.

Macoma nasuta Conr.

Plentiful with the preceding.

Macoma secta Conr.

Shells of this large species are commonly empty when collected.

Genus **TELLINA** Linné.

Tellina bodegensis Hds.

Fossil valves at Dead Man's Island. One young shell was found at Redondo Beach, by Miss Virgie Burton Williamson.

Tellina Idæ Dall.

Three shells. One fine one, collected by Mrs. Trowbridge has been figured, with description, by Mr. Dall in the Proceedings of the U. S. National Museum, Vol. XIV, No. 849, p. 183, pl. VI, fig. 3, pl. VII, figs. 1, 4, 1891.

This species is named in honor of Miss Ida M. Shepard, of Long Beach, who was the first to bring the recent shell to the attention of students. It is found fossil in the miocene of San Diego County (W. H. D.) and has been dredged off Catalina Island.

Tellina Gouldii Hanl.

Rarely found.

Tellina obtusa Cpr.

Rare; soft parts gone.

Tellina variegata Cpr.

A few found by two collectors. (C. T. S.)

Genus **ÆDALINA** Cpr.

Ædalina subdiaphana Cpr.

A few living.

Subgenus **COOPERELLA** Cpr.

Ædalina (Cooperella) scintillæformis Cpr.

One broken shell. (C. T. S.)

Genus **LUTRICOLA** Blainville.

Lutricola alta Conr.

A few live shells washed ashore in the spring; single valves common.

Genus **SEMELE** Schumacher.

Semele californica Adams. (*S. flavescent* Gld.)

One young example. (C. T. S.)

Semele decisa Conr.

Not plentiful.

Semele pulchra Sby.

Mrs. Trowbridge reports a live shell washed ashore, after a heavy storm, in San Pedro Bay. (W. H. D.)

Semele rupium Sby.

Two or three; dead.

Genus **CUMINGIA** Sowerby.

Cumingia californica Conr.

Alive at Point Fermin, between the ledges of rock, in company with Chitons.

Genus **DONAX** Linné.

Donax californicus Conr.

This little shell, rich in color-variations, is one of our "economic mollusca;" for it makes a palatable soup. Plentiful at Long Beach.

Donax flexuosus Gld.

Not often found living.

Genus **HETERODONAX** Mörch.

Heterodonax bimaculatus D'Orb.

Plentiful at San Pedro.

Heterodonax bimaculatus, var. *purpureus*.

This purple variety is common with the type.

Heterodonax bimaculatus, var. *salmoneus*.

This variety is salmon-pink, and is rare. Some shells have also been found that are canary colored.

Family **MACTRIDÆ**.

Genus **MACTRA** Linné.

Mactra (Standella) californica Conr.

Two single valves. These valves are each nearly 5 inches long.

Mactra (Standella) planulata, var. *falcata* Gld.

Often washed ashore in the spring. (W. H. D.)

Mactra (Standella) nasuta Gld.

Not plentiful. This shell is of a blue-white color, with a dingy gray, epidermis, and is thinner than the former species. Of the Mactridæ, Mr. Dall says, "names at present must be provisional."

Genus **LABIOSA** Schmidt.

Labiosa undulata Gld. (*Raeta undulata* Gray).

Single valves washed ashore in winter. Pairs not separated are very rare.

Family **VENERIDÆ**.

Genus **CALLISTA** Poli.

Callista (Amiantis) callosa Conr. (*Dione nobilis* Reeve).

This graceful bivalve is found at low tide in winter, in the bay; occasionally washed ashore.

Callista (Lioconcha) Newcombiana Gabb. Pl. XXIII, Fig. 4.

Two shells and three or four valves; Catalina.

Genus **TIVELA** Link.

Tivela crassatelloides Conr. (*Pachydesma crassatelloides* Conr.).

One of our "economic mollusca," but not as plentiful as the *Chione*. The largest shells are often used by local artists as plaques, on which miniature pictures of "old missions," etc., are painted. These shells

are from 5 to 5½ inches in length, but I have one that measures 6 inches, and weighs 22 ounces. The large shells soon lose their epidermis, so smaller ones are preferred for cabinet specimens.

Genus **PSEPHIS** Cpr.

Psephis tantilla Gld.

Rare. Arnold.

Genus **VENUS** Linné.

Venus toreuma Gld. (*Venus Fordii* Yates).

Valves not rare at Catalina Island. Two perfect examples found on the island. Two or three valves reported from San Pedro Bay. Dr. Yates's figure agrees perfectly with Gould's type. (W. H. D.)

Genus **CHIONE** Megerle.

Chione fluctifraga Sby.

This and the two following species belong to our "economic mollusca," although this is the least abundant of the three.

Chione simillima Sby.

Our most plentiful *Chione*. This species shows some variation.

Chione succincta Val.

In mud flats, with the two former species.

Chione undatella Sby. (= *C. excavata* Cpr. of California).

Worn valves comparatively plentiful at Catalina Harbor, in 1890. "The extreme limit north for it." (W. H. D.)

Genus **TAPES** Megerle.

Tapes grata Say.

Two shells found by two collectors. (W. H. D.)

Tapes laciniata Cpr.

Seldom found alive.

Tapes staminea Conr.

This "economic mollusk" of our coast is smaller than the other forms of this genus.

Tapes staminea, var. *diversa* Sby.

A few with the type.

Tapes tenerrima Cpr.

Rare; dead.

Genus **SAXIDOMUS** Conrad.

Saxidomus aratus Gld. (*S. gracilis* Gld.).

Often washed ashore in the spring. This shell, like others of the family, varies in form.

Saxidomus Nuttallii Conr.?

Beach-worn valves; may be specimens of the preceding species.

Genus **RUPELLARIA** F. de Bellevue.

Rupellaria lamellifera Conr.

Two dead shells reported.

Family **PETRICOLIDÆ**.

Genus **PETRICOLA** Lamarek.

Petricola carditoides Conr.

Only dead ones collected.

Petricola cognata Ads.

One broken valve. (W. H. D.) Mrs. Trowbridge.

Petricola tenuis Ads.?

One, young, dead. (C. T. S.) If not a form of *carditoides* this has hitherto been known only from the southern fauna.

Family **CHAMIDÆ**.

Genus **CHAMA** Brug.

Chama exogyra Conr.

Common on rocks, from which they are hard to remove, even with a hatchet, as one valve usually adheres firmly. Both sinistral and dextral shells occur in the same colony.

Chama pellucida Sby.

This species is more pellucid and frilled, and often of a bright rosy tint in some places. It is usually washed ashore from deep water.

Chama spinosa Sby.

Very rarely washed ashore. These three forms are sometimes difficult to distinguish; one species appears to run into another.

Family **CARDIIDÆ**.

Genus **CARDIUM**.

Cardium centifilosum Cpr.

One valve; Mrs. Trowbridge. Abundant in 16 fathoms at Catalina Harbor. (W. H. D.)

Cardium quadragenarium Conr.

Found at very low tide in the spring. Deep water examples are sometimes $6\frac{1}{2}$ inches from the umbo to the basal margin of the valves. Also found fossil at Dead Man's Island.

Subgenus **HEMICARDIUM** Cuvier.

Cardium (Hemicardium) biangulatum Sby.

Fresh valves, and two or three complete shells collected at Catalina. "Alive in twenty to thirty fathoms near Catalina Island." (J. G. C.)

Subgenus **LIOCARDIUM** (Sw.) Mörch.

Cardium (Liocardium) elatum Sby.

One or two juvenile valves reported.

Cardium (Liocardium) substriatum Conr.

Plentiful at times.

Family **CARDITIDÆ**.

Genus **VENERICARDIA** Lamarck.

Venericardia ventricosa Gld.

Two shells; San Pedro Bay. Arnold. Dredged off Catalina Island in 30 fathoms.

Genus **LAZARIA** Gray.

Lazaria subquadrata Cpr.

Single valves occasionally found. Complete shells very rare.

Family **LUCINIDÆ**.

Genus **LUCINA** Brug.

Lucina californica Conr.

A few found alive at the Points.

Lucina æquizonata Stearns.

Dredged in 276 fathoms off the Santa Barbara Islands by the U. S. Fish Commission.

Lucina Nuttallii Conr.

Washed ashore in the bay.

Family **DIPODONTIDÆ**.

Genus **DIPODONTA** Bronn.

Dipodonta orbella Gld.

Living examples are very rare.

Family **KELLIIDÆ**.

Genus **KELLIA** Turton.

Kellia Laperousii Deshayes.

At San Pedro, and also with barnacles on the pier at Redondo.

Kellia rotundata Cpr.

One "Nearly like *K. suborbicularis*." (C. T. S.)

Kellia suborbicularis Mont.

Rare. (C. T. S.)

Genus **LASEA** Leach.

Lasea rubra Mont.

Not rare on kelp.

Genus **TELLIMYA** Brown.

Tellimya tumida Cpr.

One specimen found. (C. T. S.)

Family **MYTILIDÆ**.

Genus **MYTILUS** Linné.

Mytilus bifurcatus Conr.

A few on the pier at Santa Monica.

Mytilus californianus Conr.

One of our "economic mollusks" though not often on sale.

Mytilus edulis Linné.

Rare on the shore; brought in by fishermen, and occasionally on sale in the fish market.

Genus **SEPTIFER** Recluz.

Septifer bifurcatus Rve.

Plentiful with *Litorina planaxis* between rocks.

Genus **MODIOLA** Lam.

Modiola capax Conr.

Living shells rare; dead valves not uncommon.

Modiola fornicata Cpr.

Shells, fasciculated by their byssus, often washed ashore.

Modiola modiolus Linné.

Two or three young specimens found in San Pedro Bay.

Modiola recta Conr.

Not many found. None exceeding three inches in length.

Subgenus **ADULA** H. & A. Ad.**Modiola (Adula) falcata** Gld.

Two or three, in soft rock; none large.

Genus **LITHOPHAGUS** Megerle.**Lithophagus plumula** Haul.

A few; living.

Family **ARCIDÆ**.Genus **ARCA** Linné.**Arca mutabilis** Sby.

One badly sea-worn valve. "Probably adventitious, as we do not know of it from north of the gulf." (W. H. D.)

Arca multicostata Sby.

Single valve; Catalina Island. "Commonly found along the coast of Lower California." (R. E. C. S.)

Genus **AXINÆA** Poli.**Axinæa intermedia** Brod.

One found in the bay. "Very fine, highly colored specimen." (W. H. D.) Miss Monks.

Family **NUCULIDÆ**.Genus **NUCULA** Lam.Subgenus **ACILA** H. & A. Ads.**Nucula (Acila) castrensis** Hinds.

Single valves (all fossil?) Dead Man's Island.

Family **LEDIDÆ**.Genus **LEDA** Schumacher.**Leda cælata** Hds.

Odd valves reported.

Genus **YOLDIA** Möreh.**Yoldia Cooperi** Gabb.

Valves washed ashore in the beach drift. "May be identical with the fossil *Y. impressa*," Conr. (J. G. C.)

Family LIMIDÆ.

Genus **LIMA** Brug.**Lima orientalis** (Adams?) Cpr. (*L. dehiscens*, Conr., of Cal. authors).

Valves washed ashore in the spring.

Family AVICULIDÆ.

Genus **AVICULA** Lamarek.**Avicula peruviana** Rve.

One valve washed ashore on Rattlesnake Island and collected by Mrs. Opar. This is one of the shells from the southern fauna referred to in the introduction as possibly adventitious.

Family PECTINIDÆ.

Genus **PECTEN** Linné.**Pecten æquisulatus** Cpr.

At San Pedro and Alamitos.

Pecten caurinus Gld.

Single valves are not rare at Dead Man's Island. All fossil? Two live examples found by Mrs. D. Garlick.

Pecten latiauritus Conr.

This shell has been labeled *P. monotimeris* Conr. by many collectors on this coast, but Mr. W. H. Dall, to whom I recently submitted a series of shells collected at Redondo Beach, San Pedro Bay and San Diego, pronounced them all *P. latiauritus*. Not plentiful. Fossil at Dead Man's Island.

Section **JANIRA** Schumacher.**Pecten (Janira) floridus** Hds.

Several valves; all fossil? "Evidently fossil and belonging in the recent state to the Lower Californian fauna." (W. H. D.) A living specimen referred by Carpenter to *J. dentata* and perhaps conspecific was dredged by Dr. Cooper at Monterey. Living specimens of *P. floridus* have been obtained at San Pedro. (W. H. D.)

Genus **HINNITES** Defrance.**Hinnites giganteus** Gray.

Occasionally found living.

Family OSTREIDÆ.

Genus **OSTREA** Linné.**Ostrea lurida** Cpr.

Plentiful in a small oyster bed near Timms Point.

Ostrea lurida var. *expansa* Cpr.

Three or four found at Catalina Island and the Bay.

Family ANOMIIDÆ.

Genus **PLACUNANOMIA** Brod.Subgenus **MONIA** Gray.**Placunanomia (Monia) macroschisma** Desh.

Single valves rare. One fine example, measuring $3\frac{1}{2}$ by 3 inches, has been reported by Miss Eleanor B. Green, of Minnesota, who informs me that this shell, found alive at Long Beach, varies considerably from the type. "The shell varies much like an oyster." (J. G. C.)

Genus **ANOMIA** Linné.**Anomia lampe** Gray.

Odd valves and two young shells reported.

SCAPHOPODA.

Genus **DENTALIUM** Linné.**Dentalium hexagonum** Sby.

Empty shells in the sand at Rattlesnake Island.

Dentalium pretiosum Nuttall.

With the last, but more plentiful.

PTEROPODA.

Family CAVOLINIIDÆ.

Genus **CAVOLINIA** Abild.**Cavolinia tridentata** Forsk. = *Hyalea tridentata*, of authors.

Three or four of these little Pteropods have been washed ashore at Long Beach. (J. G. C.)

Family CYMBULIIDÆ.

Genus **COROLLA** Dall.**Corolla spectabilis** Dall.

This Pteropod has been taken alive on the surface of the sea off the coast north of Catalina Island. (W. H. D.) *Cymbuliopsis* of Pelseneer is synonymous.

Family PNEUMODERMATIDÆ.

Genus **PNEUMODERMON** Cuvier.**Pneumodermon pacificum** Dall.

This Pteropod has been taken alive near San Pedro. (W. H. D.)

GASTROPODA.

Family UMBRACULIDÆ.

Genus **TYLODINA** Rafinesque.

Tyloдина fungina Gabb.

One shell, San Pedro Bay, and two found at Laguna Beach, by two collectors. (C. T. S.)

Family BULLIDÆ.

Genus **BULLA** Linné.

Bulla nebulosa Gld.

Plentiful on mud flats. Usually of a dark reddish-brown color.

Genus **HAMINEA** Leach.

Haminea vesicula Gld.

Very rarely washed ashore.

Haminea virescens Sby.

In moss at Catalina. Empty shells not rare in the Bay; live ones very rare.

Family ACTÆONIDÆ.

Genus **ACTÆON** Montfort.

Section **RICTAXIS** Dall.

Actæon (Rictaxis) punctocælatus Cpr.

Three or four dead examples.

Family TORNATINIDÆ.

Genus **TORNATINA** A. Adams.

Tornatina carinata Cpr.

A few examples. (J. G. C.)

Tornatina culcitella Gld.

Empty shells; not plentiful.

Tornatina inculta Gld.

One example.

Genus **VOLVULA** A. Adams.

Volvula cylindrica Cpr.

One example in coarse sand in a rock-pool. (W. H. D.)

Family AURICULIDÆ.

Genus **MELAMPUS** Montfort.**Melampus olivaceus** Cpr.

Plentiful in mud-flats.

Genus **PEDIPIES** Blainville.**Pedipes unisulcatus** J. G. Cp.

Washed ashore in the drift.

Family SIPHONARIIDÆ.

Genus **SIPHONARIA** Sby.Subgenus **WILLIAMIA** Monterosato.**Siphonaria (Williamia) peltoides** Cpr.

One worn shell found in the bay. (C. T. S.)

Family GADINIIDÆ.

Genus **GADINIA** Gray.**Gadinia reticulata** Sby.

A single dead shell reported.

Family MOPALIIDÆ.

Genus **MOPALIA** Gray.**Mopalia ciliata** Sby.

Not rare on rocks.

Mopalia lignosa Gld.Rarer than *M. ciliata*.

Family ACANTHOPLEURIDÆ.

Genus **NUTTALLINA** Cpr.**Nuttallina scabra** Rve.

The most plentiful form of Chiton.

Family ISCHNOCHITONIDÆ.

Genus **CHÆTOPLEURA** Shuttleworth.**Chætopleura (Maugerella) conspicua** Cpr.

Between ledges of rock at Point Fermin, also at White's Point. Lately identified by Dr. R. E. C. Stearns. This species has been distributed under the name of *Stenoradsia Magdalenensis*.

Chætopleura Hartwegii Cpr.

On rocks; not plentiful.

Family ACMÆIDÆ.

Genus **ACMÆA** Eschscholtz.

Acmaea asmi Midd.

A few at Point Vincent.

Acmaea insessa Hds. (*Nacella incessa* Hds. of some California authors).

Dead examples occasionally found in good condition in San Pedro Bay, and at the Points.

Acmaea mitra Esch.

Dead shells; very rare.

Acmaea paleacea Gould. (*Nacella paleacea*, Gld., of some California authors).

Found on kelp.

Acmaea patina Esch.

Abundant on the rocks at San Pedro and Point Fermin.

Acmaea patina var. *scutum* Esch.

Very few found with *A. patina*.

Acmaea pelta Esch.

Very few found.

Acmaea persona Esch.

Not plentiful.

Acmaea scabra Nutt.

With *A. patina*, but not so plentiful as the latter.

Acmaea spectrum Nutt.

Plentiful; on the rocks.

Genus **LOTTIA** Gray.

Lottia gigantea Gray.

Plentiful at Portuguese Bend.

Family FISSURELLIDÆ.

Genus **FISSURELLA** Brug.

Fissurella volcano Rve.

Most plentiful at Portuguese Bend.

Genus **FISSURIDEA** Swainson, 1840 (= *Glyphis* Carpenter, 1856, non Agassiz 1843).

Fissuridea aspera Esch.

Rare; not found living.

Fissuridea murina (Cpr.) Dall. Proc. U. S. Nat. Mus., 1885, p. 543.

Two found dead, one at Catalina. [This is the *Glyphis densiclathrata* of Californian conchologists, but not of Reeve; *G. saturnalis* of Pilsbry

(*Nautilus*, v., p. 105) not of Carpenter, and *G. densicathrata* var. *murina* of Carpenter. W. H. D.]

Fissuridea rugosa Sby.

Two found at White's Point. This is one of the southern species of shells referred to in the introduction as possibly adventitious. Arnold.

Genus **LUCAPINA** Gray.

Lucapina crenulata Sby.

Plentiful at Catalina, in the winter. Three or four live examples found, by as many persons, at the Points, and Dead Man's Island.

Genus **MEGATEBENNUS** Pilsbry.

Megatebennus bimaculatus Dall. (*Fissurellidea* and *Clypidella* of authors).

Two found in the bay.

Genus **LUCAPINELLA** Pilsbry.

Lucapinella callomarginata Cpr. (*Clypidella* of Cpr.).

Three dead shells. One live example found by M. Estella Williamson.

Family **HALIOTIDÆ**.

Genus **HALIOTIS** Linné.

Haliotis corrugata Gray.

Dead shells not often found. Live ones occasionally brought in by fishermen.

Haliotis Cracherodii Leach.

Plentiful in winter, at low tide, on the rocks. This is the "white" Abalone (pronounced "Ab'-a-lō-ně") of California, and a favorite edible shellfish of the Mexicans. Although the mother-of-pearl of these shells is usually white when decorticated, one shell picked up in San Pedro Bay, by Mrs. Emma King, when decorticated, presented a beautiful play of colors, unlike either the type or *H. fulgens*. The muscular scar was also finely colored. The spire rising higher than usual in shells of this type made the specimen more cup-shaped.

Haliotis Cracherodii var. **splendidula**.

A number of shells, found at one time, at Point Vincent, have brilliant blotches of color in their interior somewhat like *H. fulgens*. Some have spots of brown color.

Haliotis fulgens Phil. (*H. splendens* Rve.).

As the former name has precedence, according to Mr. H. A. Pilsbry, he substitutes it for *H. splendens*. This splendid shell is sometimes found very large at Portuguese Bend, at low tide, in the winter.

Family PHASIANELLIDÆ.

Genus **PHASIANELLA** Lam.**Phasianella compta** Gld.

Usually empty shells; not plentiful.

Family TURBINIDÆ.

Genus **POMAUΛAX** Gray.**Pomaulax undosus** Wood.

Plentiful in the early spring at Dead Man's Island. These shells lie close together in shallow water, many with a growth of algæ on their apical whorls; when the algæ are highly colored they present a beautiful sight under the water.

Genus **PACHYPOMA** Gray.**Pachypoma inæquale** Martyn. Pl. XIX, figs. 4 and 5; pl. XXIII, figs. 1, 3 and 5.

A half dozen; all fossil? Not uncommon, living, on the shore of Catalina island. This is the *P. gibberosum* of Chemnitz, according to Carpenter, but Martyn's name is four years older. (W. H. D.)

Genus **LEPTOTHYRA** Carpenter.**Leptothyra bacula** Cpr.

Not many shells found. Plentiful under stones in one of the valleys on Catalina Island.

Leptothyra Carpenteri Pilsbry (*L. sanguinea* of Carpenter, not of Linn.).

Very rare. In the *Nautilus* for July, 1890, Mr. H. A. Pilsbry says: "To our Californian shells we give the name of *L. Carpenteri*." The true *L. sanguinea* is Mediterranean.

Family DELPHINULIDÆ.

Genus **LIOTIA** Gray.**Liotia acuticostata** Cpr.

On actinias or sea anemones sticking to the adhesive surface; rare.

Liotia fenestrata Cpr.

Empty shells; rare.

Family TROCHIDÆ.

Genus **ETHALIA** H. & A. Adams.**Ethalia** sp.

San Pedro. "Close to *multistriata* Ver." Found at Cape St. Lucas. (W. H. D.) Arnold.

Genus **NORRISIA** Bayle.

Norrisia Norrisii Sby. (*Trochiscus Norrisii*, of authors).

Plentiful on kelp at Dead Man's Island. "The name *Trochiscus* is pre-occupied." (W. H. D.)

Genus **CHLOROSTOMA** Swainson.

Chlorostoma aureotinctum Fbs.

Most plentiful at White's Point.

Chlorostoma brunneum Phil. Pl. XXI, fig. 8.

Very few, none large.

Chlorostoma funebreale A. Ad. Pl. XXI, fig. 7.

A few at the Points.

Chlorostoma funebreale var. **subapertum** Cpr. Pl. XXI, fig. 6.

U. S. National Museum, No. 123496. This unfigured variety is here illustrated for comparison. (W. H. D.)

Chlorostoma gallina Fbs.

Our most abundant species. Some vary from the type by the absence of the numerous spots or speckles.

Chlorostoma gallina var. **pyriformis** Cpr.

A half dozen of this variety have been found. One very fine example on Rattlesnake Island, by Mrs. Charles Burton Woodhead. (J. G. C.)

Chlorostoma gallina var. **tincta** Hmp.

One shell found at Portuguese Bend. This variety has rounded whorls and is not speckled.

Chlorostoma Montereyensis Kien. (*C. Pfeifferi* Phil. of Cal. lists).

Rare; dead.

Section **OMPHALIUS** Phil.

Chlorostoma (Omphalius) viridulum var. **ligulatum** Mke. (*Omphalius fuscescens*, Phil. of California authors).

Not rare; sometimes inhabited by crabs.

Chlorostoma (Omphalius) globulus Cpr.

One shell (C. T. S.). This form was described by Carpenter from Mazatlan (Maz. Cat., 235), but is not mentioned by Mr. Pilsbry in his monograph of the group. (W. H. D.)

Genus **CALLIOSTOMA** Swainson.

Calliostoma annulatum Mart. Pl. XXII, fig. 2.

One beach-worn shell reported. (Trowbridge.)

Calliostoma canaliculatum Mart. Pl. XXII, fig. 6.

Rare; only empty shells found.

Calliostoma gemmulatum Cpr. Pl. XXII, fig. 3.

Very good specimens are found in the bay; not plentiful.

Calliostoma gloriosum Dall. Pl. XXII, fig. 5.

Four or five good shells, all dark spotted, found at San Pedro Bay. At Soquel, Monterey Bay, this species is mostly of a pale salmon color; the southern ones are darker. (W. H. D.)

Calliostoma splendens Cpr. Pl. XXI, Fig. 5.

One found; dead. (C. T. S.)

Calliostoma supragranosum Cpr.

One obtained; not found living. (C. T. S.)

Calliostoma tricolor Gabb. Pl. XIX, Fig. 8.

Examples are usually faded.

Calliostoma versicolor Mke.

One young specimen found. (C. T. S.)

Calliostoma costatum Mart. Pl. XXII, fig. 1.

Rare on San Miguel Island. (W. H. D.)

Genus **THALOTIA** Adams.

Thalotia caffee Gabb. (*Ptychostylis caffee* Gabb.).

Three recent, also fossil shells, at Dead Man's Island.

Genus **GIBBULA** Risso.

Gibbula Canfieldii Dall. ? var.

One dead shell. "Possibly an extreme form of the very variable *lirulata*. Whether *Gibbula* or *Margarita* will depend upon the anatomy. The shell has the habit of *Gibbula*." (W. H. D.) Trowbridge.

Genus **MARGARITA** Leach.

Margarita lirulata Cpr.

Rare living. Of *Margarita lirulata* Cpr., *M. acuticostata* Cpr., *Gibbula optabilis* Cpr., *G. parcipecta* Cpr., *G. succincta* Cpr., *funiculata* Cpr., and *lacunosa* Cpr., Mr. Dall says: "After a careful study of the types of

the above and hundreds of specimens, I am compelled to the belief that they are simply forms of one protean species."

Margarita pupilla Gld.

A dead one reported.

Genus **SOLARIELLA** S. Wood.

Solariella cidaris A. Ad. Pl. XXII, fig. 4.

Dredged in deep water off the islands by the U. S. Fish Commission.

Solariella peramabilis Cpr.

One or two specimens found. Dredged off Catalina living in 30 fathoms. Also found fossil.

Genus **CANTHARIDUS** Montfort.

Subgenus **HALISTYLUS** Dall.

Cantharidus (Halistylus) pupoideus Dall. Pl. XIX, Fig. 2. (*Fenella pupoidea* Cpr., not of A. Adams.)

Four found in rocky pools at Dead Man's Island. For an account of this genus see these Proceedings, XII, p. 341. The original *Fenella* is a Rissoïd.

Family **CYCLOSTREMATIDÆ**.

Genus **VITRINELLA** Adams, em.

Vitrinella Williamsoni Dall. Pl. XXI, figs. 2 and 3.

Shell small, white, depressed, with two and a half whorls; spire flattened; suture appressed with a shallow channel or excavation outside of the appressed margin of the whorl, outside of which the convexity of the whorl rises higher than the suture. Base slightly more rounded than the upper side, with a wide and flaring umbilicus; periphery rounded; aperture rounded, oblique; surface polished, finely striate here and there by the incremental lines which are most prominent above. Maximum diameter of shell, 5.5; minimum diameter, 4.5; altitude, 1.25 millimeters.

Beach at San Pedro; U. S. National Museum, registered number 106,856.

This species, which is rather large for a *Vitrinella*, is respectfully dedicated to Mrs. M. Burton Williamson, to whose researches this paper is due. The name being inherently masculine, the usual genitive ending is preserved.

Family CALYPTRAEIDÆ.

Genus **CRUCIBULUM** Schumacher.

Crucibulum imbricatum Brod. (*C. scutellatum* Gray, of Cooper Geographical Catalogue).

One in a collection of shells found on Santa Catalina Island, and two found in San Pedro Bay. From southern fauna.

Crucibulum spinosum Sby.

Washed ashore in the drift. Young ones found alive on *Pecten aequisulcatus*. Plentiful alive, at very low tide in the oyster bed at San Pedro.

Genus **CREPIDULA** Lam.

Crepidula aculeata Gmel.

One or two reported.

Crepidula adunca Sby.

A few found living.

Crepidula dorsata Brod.

Not rare; these shells vary much in color and habit.

Crepidula excavata Brod.

Shells with the soft parts gone are sometimes found in the drift. "Does not exactly agree with any of our shells, but is probably this." (C. T. S.)

Crepidula explanata Gld. (*C. exuviata* Nutt.).

Three or four, found by two or three collectors.

Crepidula navicelloides Nutt.

Plentiful in dead gastropods.

Crepidula onyx Sby. var. **rugosa** Nutt.

Plentiful, often in clusters, one on another, and variable in shape. I have one old beach-worn example, of which the outline on one side describes a semicircle. Shells found on *Norrisia* are of a light magenta-pink in the interior. The form of the septum, or deck, of the pink shells that I have seen varies from that of the var. *rugosa*.

Genus **GALERUS** (Humphr.) Gray.

Galerus mammillaris Brod. (*G. fastigiatus* Gld., perhaps *G. contortus* Cpr.).

Two found dead at Long Beach. (C. T. S.)

Family AMALTHEIDÆ.

Genus **AMALTHEA** Schum., 1817 (*Hipponyx* Defrance, 1819.),**Amalthea antiquata** Linn.

Empty shells are washed ashore at the bay. A few found living with *A. tumens*, nestled close to some big Chitons (*Maugerella conspicua*) in a cleft of rock at Point Fermin.

Amalthea cranioides Cpr.

Rare; with *A. antiquata*. This shell is flat and has the apex near the center.

Amalthea serrata Cpr.

Two or three found at San Pedro. These shells have a brown epidermis, in irregular patches.

Amalthea tumens Cpr.

With *A. antiquata*, but not so plentiful.

Family VERMETIDÆ.

Genus **SERPULORBIS** Sassi.**Serpulorbis squamigerus** Cpr.

Less plentiful than the variety below.

Serpulorbis squamigerus Cpr., var. **pennatus** Mörch.

Usually found in colonies on the rocks.

Genus **BIVONIA** Gray.**Bivonia compacta** Cpr.

Only dead shells found; rare. (J. G. C.)

Genus **SPIROGLYPHUS** Daudin.**Spiroglyphus lituella** Mörch.

On kelp; Catalina Island and Portuguese Bend. (R. E. C. S.)

Family CÆCIDÆ.

Genus **CÆCUM** Fleming.**Cæcum crebricinctum** Cpr.

Ten or twelve found at San Pedro; dead. (C. T. S.)

Family TURRITELLIDÆ.

Genus **TURRITELLA** Lam.

Turritella Cooperi Cpr.

Dead shells are not uncommon; living ones very rare.

Turritella (Mesalia) lacteola Cpr.

Three found. (C. T. S.)

Family CERITHIIDÆ.

Genus **CERITHIDEA** Swainson.

Cerithidea californica Held. (1840 + *C. sacrata*, Gld. 1849, + *C. pullata* Gld.).

Plentiful on mud flats. "Several variations are caused by the amount of freshness in the water; sometimes marked by yellow bands." (J. G. C.)

Genus **BITTIUM** Leach.

Bittium asperum Cpr.

Dead Man's Island. Fossil in San Pedro City. (J. G. C.)

Bittium quadrifilatum Cpr. Pl. XXI, fig. 4

A few found living.

Family LITTORINIDÆ.

Genus **LITTORINA** Fér.

Littorina planaxis Nutt.

Abundant on rocks.

Littorina scutulata Gld.

Less abundant than the former.

Littorina scutulata var. *plena* Gld.

A few with the type.

Littorina scutulata var.

Six or eight. This variety is small and almost black.

Genus **ASSIMINEA** Leach.

Assiminea californica Cooper.

One living and one dead example at San Pedro. (C. T. S.)

Genus **LACUNA** Turton.

Lacuna unifasciata Cpr.

Three dead.

Lacuna solidula Lovèn.

Rare living; San Pedro. (C. T. S.)

Family FOSSARIDÆ.

Genus **ISAPIS** Cpr.**Isapis fenestratus** Cpr.

Rare; rock pools. Also fossil in San Pedro City. (J. G. C.)

Family RISSOIDÆ.

Genus **RISSEA** Fremerville.**Rissea (Alvania) reticulata** Cpr.One example. (C. T. S.) *Rissoina purpurea* of Cooper.

Family TRUNCATELLIDÆ.

Genus **TRUNCATELLA** Risso.**Truncatella californica** Pfr.

On sea weed, not many found. (C. T. S.)

Truncatella Stimpsoni Stearns.

One. (C. T. S.)

Family JEFFREYSIIDÆ.

Genus **JEFFREYSIA** Alder.**Jeffreysia** sp.

One worn specimen found near Dead Man's Island. (W. H. D.)

Jeffreysia translucens Cpr.

Three or four. (C. T. S.)

Family OVULIDÆ.

Genus **OVULA** Bruguière.**Ovula (Simnia) deflexa** Sby. var. *barbarens* Dall. Pl. XXI, fig. 1.

One example, one inch in length, found in San Pedro Bay, by Miss Monks.

[*O. deflexa* is a southern form, but was reported by Col. Jewett from Santa Barbara. His specimen was probably the same as the form here figured, which is of a whitish color and does not seem to agree perfectly with Sowerby's figures. I therefore separate it varietally until more is known. If it prove distinct from *deflexa* the varietal name may take specific rank. W. H. D.]

Family CYPRÆIDÆ.

Genus **CYPRÆA** Linné.**Cypræa spadicea** Gray.

Living, at the Points. Also Laguna Beach. Not plentiful in Los Angeles County.

Genus **TRIVIA** Gray.**Trivia californica** Gray.

In the coarse sand at the Points, Dead Man's Island, and Santa Catalina Island. Three live ones washed ashore at San Pedro; also living at Laguna Beach.

Trivia Solandri Gray.

With the preceding and more plentiful.

Genus **ERATO** Risso.**Erato columbella** Mke.

Not often found, and not reported living.

Erato vitellina Hds.

Good examples are rare.

Family TEREBRIDÆ.

Genus **TEREBRA** Brug.Section **ACUS** Adams,**Terebra (Acus) simplex** Cpr. (*Myurella simplex* Cpr.).

Dead shells not rare. Ten or twelve live ones in the sand on Timm's Point.

Terebra (Acus) specillata Hinds.

White, with irregular brown markings. Three or four of these pretty forms have been found in the bay. "They will probably be found to grade into *T. simplex*." (W. H. D.)

Family PLEUROTOMIDÆ.

Genus **PLEUROTOMA** Lam.***Pleurotoma tuberculata** Gray.

One shell found by Mrs. Purdy, of Los Angeles.

Subgenus **GENOTA** Adams.Section **DOLICHOTOMA** Bellardi.

Pleurotoma (Dolichotoma) Carpenteriana Gabb. (*Surcula Carpenteriana* Gabb.)
Rare, dead. One splendid example, four and one-eighth inches long,

was found alive at Ballona Harbor by Mrs. Spar. For notes on *Genota*—section *Dolichotoma*—see Report on Albatross Mollusca, Dall, Proc. U. S. Nat. Mus., vol. XII, No. 773, p. 303.

Genus **DRILLIA** Gray.

Drillia inermis Hd.

Found with *Cerithidea californica*, at Alamitos, by M. Estella Williamson. Also fossil; in San Pedro City bluffs.

Drillia penicillata Cpr.

Living shells seldom found; usually inhabited by crabs. A beautiful species with wavy hair lines across the whorls.

Drillia torosa Cpr. var.

Three shells, all broken. This variety is spotted. Point Fermin. (J. G. C.)

Genus **MANGILIA** Risso.

Mangilia striosa C. B. Ad.

Rare; dead. The generic name is taken from an Italian conchologist who was called Mangili.

Subgenus **CYTHARA** Schumacher.

Mangilia (Cythara) variegata, Cpr. (*Mangilia variegata* Cpr., var. *nitens*, of West Coast lists).

Three or four live examples. (W. H. D.)

Genus **MITROMORPHA** Adams.

Mitromorpha aspera Cpr. Pl. XIX, fig. 3.

One. (C. T. S.)

Mitromorpha filosa Cpr. Pl. XIX, fig. 1.

One (young) broken. (C. T. S.)

Family **CONIDÆ**.

Genus **CONUS** Linné.

Conus californicus Hds.

Plentiful in moss at Point Fermin. Washed ashore in the bay with live *Crepidulæ* on them.

Family **PYRAMIDELLIDÆ**.

Genus **PYRAMIDELLA** Lam.

Pyramidella conica Ads. var. *variegata* Cpr. (*Obeliscus*).

Three or four dead shells. (W. H. D.)

Genus **ODOSTOMIA** Fleming.

Odostomia *gravida* Cpr.

A few living. (J. G. C.)

Odostomia *inflata* Cpr.

Alive on the back of a *Haliotis corrugata* brought in by a fisherman.

Odostomia *nuciformis*, Cpr.

A few dead shells.

Genus **TURBONILLA** Leach,

Turbonilla *chocolata* Cpr. (*Chemnitzia*).

One young specimen, dead, found at San Pedro. (C. T. S.)

Turbonilla *stylina* Cpr.

One young specimen. (C. T. S.)

Turbonilla *aurantia*, Cpr. (*Chemnitzia* var. *aurantia* Cpr.).

Three faded ones. (C. T. S.)

Turbonilla *tenuicula* Gould.

One specimen. (C. T. S.)

Turbonilla *tenuilirata* Cpr.

Two examples. (C. T. S.)

Turbonilla *torquata* Gld. var.

Three dead specimens. (C. T. S.)

Family **EULIMIDÆ**.

Genus **EULIMA** Risso.

Eulima *micans* Cpr.

Dead specimens, rarely found.

Family **SCALIDÆ**.

Genus **SCALA** Humphrey.

Scala *bellastriata* Cpr. (*Scalaria bellastriata* Cpr.).

Good examples found in the beach drift. One found alive by Mrs. Trowbridge.

Scala *Hindsii* Cpr.

With the former species, not rare. A southern form first collected at Santa Barbara by Col. Jewett.

Scala indianorum Cpr.

Rare; dead; also fossil.

Scala occidentalis Nyst.

San Pedro (W. H. D.) Arnold. New to the fauna.

Scala retiporosa Cpr.

One dead shell. (C. T. S.)

Subgenus **OPALIA** Adams.**Scala (Opalia) borealis** Gld.

Three or four examples; all fossil?

Scala (Opalia) crenata Linn. var. **crenatoides** Cpr.

A few dead shells. One live shell, Portuguese Bend, found by M. Estella Williamson. Alive at Laguna Beach. "Abundant off Catalina Island, in mud at 16 fathoms." (W. H. D.)

Family **CERITHIOPSIDÆ**.Genus **CERITHIOPSIS** F. & H.**Cerithiopsis fortior** Cpr.

"Shells too much broken to be sure of identity." (J. G. C.)

Cerithiopsis munita Cpr.

One, dead. "Slender form." (J. G. C.)

Cerithiopsis purpurea Cpr.

Three. (C. T. S.)

Cerithiopsis tuberculata Mont.

Very few; dead.

Family **JANTHINIDÆ**.Genus **JANTHINA** Lam.

Janthina exigua Lamk. (*Janthina bifida* Totten; *J. trifida*, of California authors).

One day in March, last year (1889), a number of these ocean snails were washed ashore at Long Beach. This year (1890) not one has been found in the bay that I have heard of, but in the early spring months some were washed ashore at Catalina Island.

Family CANCELLARIIDÆ.

Genus **CANCELLARIA** Lam.

Cancellaria Cooperi Gabb. Pl. XXII, fig. 2.

Three sea-worn examples of this rare and splendid species were found by two collectors.

Family LAMELLARIIDÆ.

Genus **LAMELLARIA** Montagu.

Lamellaria Stearnsii Dall.

One shell; soft parts gone. Monks.

Family NATICIDÆ.

Genus **SIGARETUS** Lam.

Sigaretus debilis Gld.

Occasionally washed ashore in the winter with the soft parts gone. One fine shell, with part of the epidermis remaining, was collected by Miss Monks, on Rattlesnake Island.

Genus **NATICA** Lam.

Subgenus **LUNATIA** Gray.

Natica (Lunatia) Lewisii Gld.

Not often found with the animal in them. Largest ones washed ashore in the bay and at Catalina Island.

Subgenus **NEVERITA** RISSO.

Natica (Neverita) Recluziana Petit.

Plentiful in the sand, at Santa Monica with *Tivela*.

Family TRITONIIDÆ.

Genus **RANELLA** Lam.

Ranella californica Hds.

Occasionally washed ashore. Often brought in by fishermen.

Family MITRIDÆ.

Genus **MITRA** Lam.

Mitra maura Swains.

Not plentiful, dead. Two or three have been found alive.

Family MARGINELLIDÆ.

Genus **MARGINELLA** Lam.**Marginella Jewettii** Cpr. Pl. XIX, fig. 6.

San Pedro, Jewett in U. S. Nat. Museum.

Marginella pyriformis Cpr. Pl. XX, fig. 5.

One or two. (C. T. S.)

Marginella regularis Cpr.

One empty shell. (C. T. S.)

Section VOLVARINA Hinds.

Marginella (Volvarina) varia Sby.

Under stones; rare. Common at Catalina.

Family OLIVIDÆ.

Genus **OLIVELLA** Swainson.**Olivella biplicata** Sby.

In the sand near Dead Man's Island. Dead shells not uncommon in the bay.

Olivella biplicata var. *alba*.

Seldom found.

Olivella biplicata var. *brunnea*.This brown variety is rare, and not found living. Dr. Cooper says *O. biplicata* "varies in color from black through brown, purple, gray and pink to white."**Olivella intorta** Cpr. Pl. XIX, fig. 9.

Santa Cruz to Lower California, U. S. Nat. Museum.

Olivella bætica Cpr. Pl. XIX, fig. 7.

In the sand in both bays, although not plentiful.

Family NASSIDÆ.

Genus **NASSA** Lam.**Nassa fossata** Gld.

Adults seldom collected.

Nassa insculpta Cpr. Pl. XXIII, fig. 6.

Three; Catalina Island. (J. G. C.) Not uncommon at 16 fathoms depth. Fossil in Pleistocene.

Nassa mendica Gld.

Three; Catalina Island. Rare, and not found alive at San Pedro.
(R. E. C. S.)

Nassa mendica var. **Cooperi** Fbs.

Alive at Catalina. Fossil at San Pedro. (R. E. C. S.)

Nassa mendica var. **elongata**.

This variety is unusually long. (R. E. C. S.)

Nassa perpinguis Hds.

Empty shells plentiful in the drift on the beach.

Nassa tegula Rve.

On mud flats. ("Close to *N. vibex* of the Atlantic." W. H. D.)

Family **COLUMBELLIDÆ**.Genus **COLUMBELLA** Lam.**Columbella baccata** Gask.

A young dead one. (C. T. S.) Southern fauna.

Columbella (Astyris) carinata Hds.

Not rare; often dead.

Columbella (Astyris) gausapata Gld.

Rarer than *C. carinata*.

Columbella (Astyris) tuberosa Cpr. Pl. xx, fig. 6.

Two or three dead shells. *Amycla* of Carpenter.

Columbella (Anachis) penicillata Cpr.

Two. (W. H. D.) Southern fauna.

Columbella (Anachis) tinctoria Cpr.

One dead. "Gulf of California shell." (C. T. S.)

Columbella (Æsopus) chrysalloidea Cpr.

One on San Pedro beach, [Cooper] U. S. Nat. Museum.

Genus **AMPHISSA** Adams.**Amphissa versicolor** Dall. Pl. xx, fig. 9.

A few living specimens found. One here figured is rather shorter proportionately than the majority of specimens. (W. H. D.)

Amphissa bicolor Dall. Pl. xx, fig. 4.

Shell small, solid, pale with brown bands and six convex whorls; nucleus eroded in the specimens; suture distinct, not appressed, whorls

full, with 11 to 13 narrow rounded ribs extending nearly from suture to suture; spiral sculpture of numerous flattened strap-like cinguli separated by subequal channeled shallow interspaces; epidermis thin and yellowish; color of shell pale straw color with a brownish base and a brown band extending from the periphery half-way back to the suture; aperture about equal to the spire, the penultimate rib behind it a little swollen; pillar slender, polished white with little callus; canal wide, short, recurved; outer lip simple, slightly reflected; not lirate inside. Longitude of shell, 14.0; of aperture, 7.7; maximum diameter of shell, 8.0 millimeters.

Habitat: Dredged by the U. S. Fish Commission at various places off the coast from Point Sur to San Diego, and in the Santa Barbara channel in depths varying from 124 fathoms at the south to 298 fathoms at the north, over a sandy or muddy bottom.

The operculum is brownish and resembles that of *A. versicolor* Dall. The brown coloration, though generally disposed in bands as described, is variable, and occasionally appears in a zigzag pattern on the pale ground, or generally suffused over the surface, or even maculated, as in *Nitidella*. The apex when perfect is probably moderately acute, but is more or less eroded on all the specimens. (W. H. D.)

Amphissa undata Cpr. Pl. xx, fig. 8.

Plentiful in 16 fathoms mud, off Catalina Island. This was described by Carpenter as *Amycla undata* and for some time confounded by him with *A. versicolor*. The fine series of *A. corrugata* Rve., *undata*, *versicolor*, etc., now in the National Museum, enable the species to be distinctly differentiated. (W. H. D.)

Family MURICIDÆ.

Genus **PURPURA** Brug.

Purpura lima Mart. var. *emarginata* Desh.

This shell, and two or three varieties of *P. lima*, have been reported from Laguna Beach, Orange County. I have not seen, nor heard of, a recent *Purpura* in Los Angeles County. That it should be found living in the county south of us and in Ventura County north of us, yet not collected here, is certainly noticeable.

Genus **MONOCEROS** Lam. (*Acanthina* F. de Waldheim).

Monoceros engonatum Conr.

Plentiful on the rocks at Rattlesnake Island.

Monoceros engonatum var. *spiratum* Blainv.

A few with the type.

Genus **OCINEBRA** Leach.

Ocinebra circumtexta Stearns. Pl. xx, fig. 2.

Not rare under stones at Portuguese Bend.

Ocinebra circumtexta var.

Three or four, without bands. (R. E. C. S.)

Ocinebra foveolata Hds.

One. (W. H. D.) Trowbridge. Southern fauna.

Ocinebra foveolata var.?

Two. "A variety, probably." (W. H. D.) Trowbridge.

Ocinebra gracillima Stearns.

A few at Point Fermin. (R. E. C. S.)

Ocinebra interfossa Cpr.

Three or four sea-worn examples.

Ocinebra subangulata Stearns.

Two or three shells found. (J. G. C.)

Ocinebra Poulsoni Nutt.

Often inhabited by crabs.

Ocinebra lurida Cpr. Pl. xx, fig. 7.

San Pedro, U. S. Nat. Museum.

Ocinebra lurida var. **munda** Cpr. Pl. xx, fig. 3.

Catalina Island. (W. H. D.)

Genus **PTERORHYTIS** Conrad.

Pterorhytis Nuttalli Conr. (*Cerostoma Nuttalli*, of authors).

Not rare in rock pools; often inhabited by crabs. Some shells are dingy white, others a reddish-brown color. The name *Cerostoma* is pre-occupied. The name *Pterorhytis* was substituted for it by Conrad afterwards. (W. H. D.)

Pterorhytis trialatus Sby. (*Murex trialatus* Sby.).

Have seen three good examples, one found by a Mexican. Shells rare, and usually badly sea-worn.

Genus **PTERONOTUS** Swainson.

Pteronotus festivus Hds.

In tide pools, often inhabited by crabs.

Genus **MURICIDEA** Swainson.

Muricidea barbarensis Gabb.

One dead example. Mrs. Emma King.

Muricidea incisa Brod.

Dead shells common at Catalina; live ones not often collected. Rare in the bay. Alive at Laguna Beach, Orange County.

Genus **CHORUS** Gray.

Chorus Belcheri Hds.

Occasionally found alive in the spring. Often brought in by fishermen. Three young specimens collected at Catalina Island were very thick for their size.

Genus **TROPHON** Montfort.

Subgenus **BOREOTROPHON** Fischer.

Trophon (Boreotrophon) triangulatus Cpr.

Two or three dead shells. One splendid specimen, found at San Pedro by Miss Hale, and now in the National Museum, is figured in Proc. U. S. Nat. Mus., Vol. XIV, Pl. v, Figs. 1, 3, and 6, 1891.

Family **BUCCINIDÆ**.

Genus **CHRYSDOMUS** Swainson.

Section **KELLETTIA** Bayle.

Chrysodomus (Kellettia) Kelletti, Fbs. (*Siphonalia* of Carpenter, not of Adams).

Dead shells rare. Live ones brought in by fishermen. Dredged alive in Catalina Harbor. (W. H. D.) The original *Siphonalia* is identical with the much earlier *Strepsidura* of Swainson, but there is no reason to suppose that *Kellettia* belongs to that group. (W. H. D.)

Genus **MACRON** Adams.

Macron lividus A. Adams.

Living at low water on Catalina Island and Laguna Beach.

Family FASCIOLARIIDÆ.

Genus **FUSUS** Lam.**Fusus barbarensis** Trask.

Some fine fossil shells have been found in soft rock at Dead Man's Island. "Two living specimens from Catalina Island are now in the National Museum. Probably the adult of the San Pedro fossil described in 1855, by Dr. Trask, as *F. barbarensis*. Similar to, though not identical with, *F. Burnsii* Dall, from the Virginia Miocene." (W. H. D.) One fossil shell found in San Pedro Bay, by Mr. George Gillette, measured $4\frac{1}{2}$ inches in length.

Fusus Kobelti Dall.

Live shells not often washed ashore at Catalina. Dead examples frequently found on the island. Rare at San Pedro.

Fusus luteopictus Dall. Pl. xx, fig. 1.

Four, all dead, but three in good condition. (W. H. D.)

CEPHALOPODA.

Family ARGONAUTIDÆ.

Genus **ARGONAUTA** Linn.**Argonauta pacifica** Dall.

Several shells were washed ashore at Catalina Island this year.

Family OCTOPODIDÆ.

Genus **OCTOPUS** Lam.**Octopus punctatus** Gabb.

Two or three have been noted. One animal measured over 39 inches across.

SUPPLEMENTARY LIST OF RECENT MOLLUSCA, NOT LATELY FOUND.

Twenty-five years ago, Dr. J. G. Cooper collected shells at San Pedro and vicinity, dredging especially about Catalina Island. He afterwards, in 1867, published his "Geographical Catalogue of the Mollusks found West of the Rocky Mountains," in which this information was embodied. Dr. Cooper has kindly furnished me with a list of shells found in and near San Pedro Bay at that time. In 1873, Mr. W. H. Dall dredged extensively in and near Catalina Harbor, adding a number of species to the fauna. Not wishing to duplicate any names already on my list, I only add a list of such marine forms as have not

been collected during the past two years, many of which being native to Catalina are likely to be found in the bay. For convenience of reference these are arranged alphabetically. Those marked with an asterisk were obtained at San Pedro, the others are from Catalina Island.

Astarte fluctuata, Cpr.
Acanthochiton aricula, Cpr.
 **Amphithalamus lacunatus*, Cpr.
Barbatia gradata Sby.
Barleeia haliotiophila, Cpr.
Barleeia subtennis, Cpr.
Bittium armillatum, Cpr.
Cæcum californicum, Dall.
 **Cerithiopsis assimilata*, C. B. Ad.
 **Cerithiopsis columna*, Cpr.
 ?*Chlorostoma pulligo* Mart.†
 **Chrysallida pumila* Cpr.
Clathurella constricta, Gabb.
Clathurella crystallina, Gabb.
Crenella decussata, Mont.
Cryptodon flexuosus, Mont.
Cyathodonta undulata, Conr.
Cythna albida, Cpr.
Daphnella clathrata, Gabb.
 **Diala acuta*, Cpr.
 **Diala marmorea*, Cpr.
Dunkeria laminata, Cpr.
Entodesma inflata, Conr.

**Eulima compacta* Cpr.
Gibbula optabilis Cpr.
Isapis obtusa Cpr.
Kennerlyia bicarinata, Cpr.
Lepidopleurus scabricostatus, Cpr.
Lepidopleurus pectinatus, Cpr.
Limatula subauriculata, Mont.
Laqueus californicus, Koch.
Lucina tenuisculpta, Cpr.
Macoma inquinata Desh.
Martesia intercalata, Cpr.
Mytilimeria Nuttallii, Conr.
Opalia retiporosa, Cpr.
Plectodon scaber, Cpr.
Psephis Lordi, Baird.
Psephis salmonea, Cpr.
Puncturella Cooperi, Cpr.
Rissoina interfossa, Cpr.
 **Scala crebricostata* Cpr.
Semele incongrua, Cpr.
 **Styliferina turrata* Cpr.
Terebratella occidentalis Dall.
 **Xylotrya setacea* Tryon.

SUPPLEMENTARY NOTE.

Since the time when this list was finished and submitted for publication, the collectors of Los Angeles County have not been idle and their work has borne abundant fruit. The species added have been incorporated in the proofs, but a few words seem appropriate in regard to some of the finds. Miss Shepard, to whose successful energy in collecting I am greatly indebted for the completeness of this list, has continued her work with exceptionally good results; Miss Monks has also been remarkably successful, especially in obtaining a fine series of the fossil forms of *Fusus* from the blue clay of Dead Man's Island and of the recent *Scala bellastriata* and other interesting forms. The living specimen of *Pecten floridus*, referred to in the text, was obtained by Mrs. Garlick at Timms Point and is now in the possession of Mr. Orcutt, of San Diego. Mrs. Redding, of Long Beach, has obtained several additional specimens of the *Periploma discus*. *Pleurotoma* (*Dolichotoma*) *Carpenteriana* var. *Tryoniana* Gabb has been collected at San Pedro by Miss Monks; who has also found specimens of *Trophon triangulatus*, of which fine specimens exist in the State collection at Berkeley, where they had till recently been confounded with *Chorus Belcheri* junior. It appears that the number of varices in this species is some-

† San Pedro. Perhaps *C. Montereyensis* worn.

times larger than in the figured type. Among the shells collected by Mr. Arnold is a very young specimen of *Avicula*, which goes to confirm the nativity of the questionable specimen of *A. peruviana* before enumerated. A remarkable find of several hundred *Nassa fossata*, and another of especially fine *Cardium substriatum*, both at San Pedro, are among the interesting data of our later conchological notes.

Los Angeles, May, 1892.

EXPLANATION OF PLATES.

NOTE.—The figures being enlarged or reduced from the actual size of the specimens, the actual largest diameter of the specimen, as seen in the figure, is mentioned in millimeters, of which 1 is equal to $\frac{1}{25}$ of an inch. The Museum registration number of the specimen is also added.

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