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IV

TERTIARY AND PLEISTOCENE MOLLUSCA FROM THE GALAPAGOS ISLANDS

BY

WILLIAM HEALEY DALL

AND

WASHINGTON HENRY OCHSNER

EDITOR'S NOTE

During 1905 and 1906 an expedition from the California Academy of Sciences spent 18 months in the exploration of the Galapagos Islands. Very large collections were made in several branches of natural history and the present report contains descriptions of the fossil Mollusca. Geology, paleontology and conchology were in charge of Mr. Ochsner and the material he assembled far exceeded in quantity and importance that secured in these branches by any previous or subsequent expedition. A preliminary notice giving a brief summary of the geological and paleontological results was published in 1924 by Dr. Dall.[1]

Previous reports on the Expedition of 1905-1906 have been published as: Proceedings of the California Academy of Sciences, 4th Ser., Vol. I, Vol. II, Pts. 1, 2, Nos. 1–18.

Various circumstances have contributed to delay the publication of the final reports on the fossils and land shells until this time although the manuscript has been almost complete for several years. In the meantime both authors have died[2]. The final preparation of the manuscript for the printer has been undertaken by Dr. G. Dallas Hanna and his part has been made possible through hearty cooperation of all interested persons; especially should be men-

[1] (Note on fossiliferous strata on the Galapagos Islands explored by W. H. Ochsner of the Expedition of the California Academy of Sciences in 1905-6. <Geol. Mag., Vol. 61, No. 723, 1924, pp. 428-9.)

[2] Dr. Dall in Washington, D. C., March 27, 1927, and Mr. Ochsner in Portland, Oregon, April 11, 1927.

tioned the following, to all of whom the Academy is very grateful: Mrs. Hilda Carling Ochsner; Mr. Charles H. Shaw; Mr. Randolph V. Whiting and Mr. Henry F. Wrigley.

The actual descriptions of the fossils were drawn by Dr. Dall. Except for the necessary changing of four new specific names and the addition of fuller locality data from Mr. Ochsner's notes, this portion of the paper remains as submitted. All locality data and general notes were supplied by Mr. Ochsner. Most of this material is taken almost verbatim from his note books, written in the field. The sketch maps and sections are tracings from originals found in these note books, now deposited in the Academy. The original base map was the U. S. Hydrographic Office sailing chart of the Galapagos Islands.

It was the expressed wish of both Dr. Dall and Mr. Ochsner that the report on the fossils should appear under joint authorship.

The plates of fossils have been made from photographs taken by Dr. Hanna.

—*Editor*

INTRODUCTION

The fauna of the Galapagos Islands has been the subject of much discussion. The islands have been held by some to have been a part of the American continent, separated by subsidence of a connecting area; others have considered them to be a permanently isolated group formed by volcanic action and built from the depths of the ocean by volcanic ejections. Still another hypothesis is that they form the remnants of an outlying archipelago of a former Pacific continent now submerged below the sea.

A discussion of the recent fauna by eminent specialists has led to the conclusion that in large part it is of American derivation, modified by long isolation. This is especially true of the land animals, while the marine invertebrates, although predominantly of American affinities, also include a small proportion of forms now more characteristic of the Pacific islands to the westward and southward. However, the marine invertebrate fauna of Clarion Island, one of the nearest to the Galapagos, so far as yet explored, is of a strictly Indo-Pacific type and presents a strong contrast to the fauna of the Galapagos.

One of the most interesting and important of the discoveries made by the Academy's Expedition of 1905-1906 was the discovery of fossil Mollusca in several places.

Formerly it was supposed that the islands were wholly of volcanic origin, or at least destitute of fossil-bearing sedimentary rocks. The discovery of these not only affords a clue to

the minimum age of the Galapagos group, but also an indication of the sources from which its fauna has been derived.

It is known that about the end of the Oligocene period, or in the early Miocene, a movement in elevation of the earth's crust in the Panamic region resulted in the union of the continents of North and South America and the closing of the gap between them through which the Eocene marine fauna of the north and west shores of South America had previously extended.

It seems a reasonable hypothesis that, during the widespread volcanic activity of the Miocene, the Galapagos group, or its preexisting nucleus, underwent enlargement and elevation, a process which the discoveries made by the Academy's expedition show continued, perhaps intermittently, into Pleistocene time.[3]

The characteristics of the fossils collected are, with hardly an exception, typically American. The faunas are tropical, as might be expected, but there is nothing of a typical Indo-Pacific nature, although some of the species belong to groups widely distributed in tropical seas, both of America and elsewhere.

While most of the species belong to groups now represented in the Panamic fauna there are a few which recall forms now existing only on the Antillean side, and quite a number which belong rather to the subdivision of the Panamic fauna now existing in the Gulf of California, than to the warmer waters of the Gulf of Panama. The inference might be drawn from this that at the time the Galapagos fossil forms were living, the temperature of the local seas was somewhat cooler than at present.[4]

COLLECTING STATIONS

Albemarle Island.—About 1¼ miles northeast of the settlement of Vilamil, Albemarle Island, Locs. 802, 803 (C.A.S.). The locality is reached from the settlement by

[3] Mr. Joseph R. Slevin of the department of herpetology of the Academy and who was a member of the 1905-1906 expedition, visited the islands again in December, 1927, and reports violent volcanic activity on Narborough Island on December 13.—*Editor.*

[4] It is suggested from the present study that the fossils from Albemarle Island are Pleistocene in age while those from Indefatigable and Seymour are Pliocene.

crossing an almost level, barren, lava flow. The fossil-bearing sediments are covered with green bushes that stand out in sharp contrast with the surroundings. This vegetated area is a gently undulating plain, the soil of which is composed of a white shell-sand such as forms the beaches of the islands in

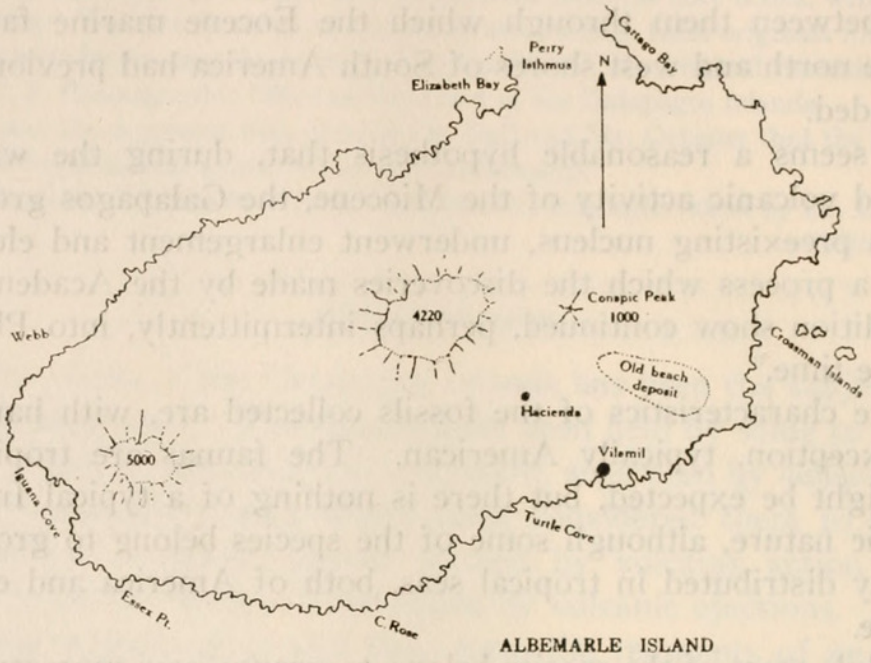

Fig. 1. Sketch map of lower part of Albemarle Island showing location of old beach deposit; this deposit is 40 feet above sea level and contains many marine fossils believed to be Pleistocene in age.

most places at the present time. The fossils are found in considerable abundance on the surface, the easily eroding, sandy matrix having broken down readily even in this dry zone. The entire area is an old weathered beach, about 40 feet above the sea, and it is believed that the fossils collected prove the age of the deposit to be younger than either that found on Indefatigable or on Seymour Island.

Indefatigable Island.—The northeast side of this large island appears from the sea to be an unbroken line of cliffs 50 to 150 feet high. The expedition's vessel, the *"Academy,"* anchored opposite a short narrow beach of basaltic pebbles, a short distance south of Gordon Rocks; here a landing was made. [See map.] The cliffs at this point are distinctly stratified and a large collection of fossils was secured from the vari-

ous layers. Four zones were differentiated and numbered *A, B, C* and *D*. [Zones *A, B* and *D* bear locality numbers 807, 808, and 809, respectively, in the Academy's series. G. D. H.] The relative position and thickness of the zones is shown in the accompanying section. [The fossils of zones

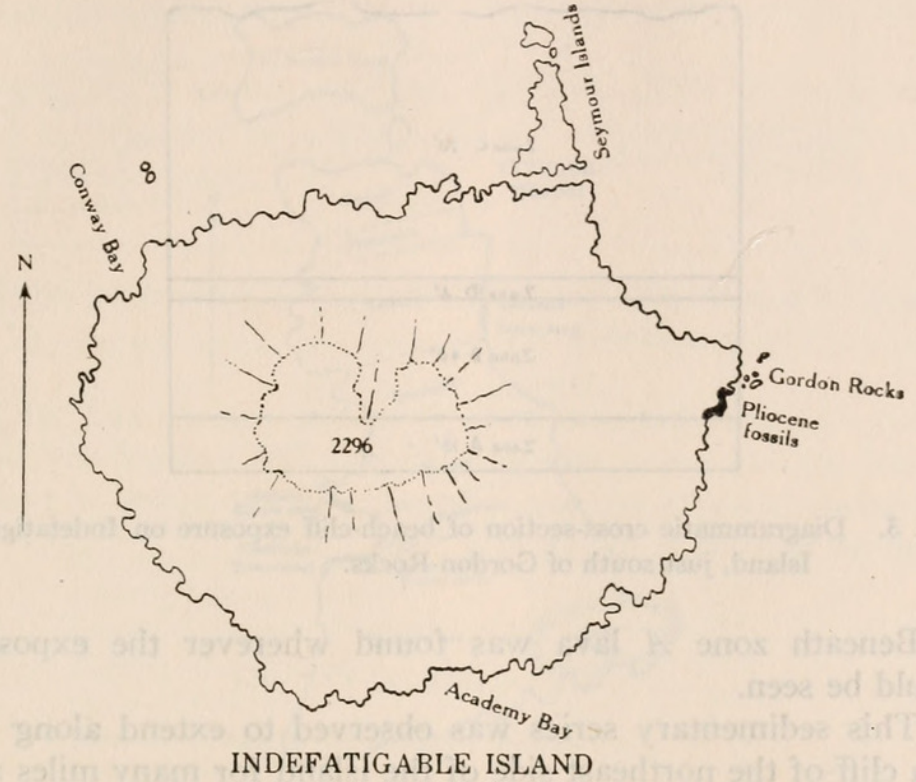

Fig. 2. Sketch map of Indefatigable Island showing location of fossil-deposit just south of Gordon Rocks. This deposit contains many marine fossils believed to be Pliocene in age.

B and *D* were not segregated in the check-list shown below. G. D. H.]

Zone *A*, the lower-most bed, is a hard, compact, light-colored, crystalline sandstone, evidently an old beach deposit. It can be traced along the cliffs for a considerable distance and is about 15 feet thick.

Zone *B* lies conformably on zone *A* but is a reddish, tufa-like sandstone which crumbles readily under the hammer. The rocks of zone *A* formed a natural shelf upon which fallen blocks of *B* and *D* rested and from these blocks many fossils were taken. Zone *B* is about 40 feet thick.

Zone *D* is a layer about four feet thick at the top of *B*, and contained many fossils; the assemblage seemed to differ somewhat from *B*.

Zone *C* is the lava capping to the sedimentary series and at the collecting point was about 70 feet thick.

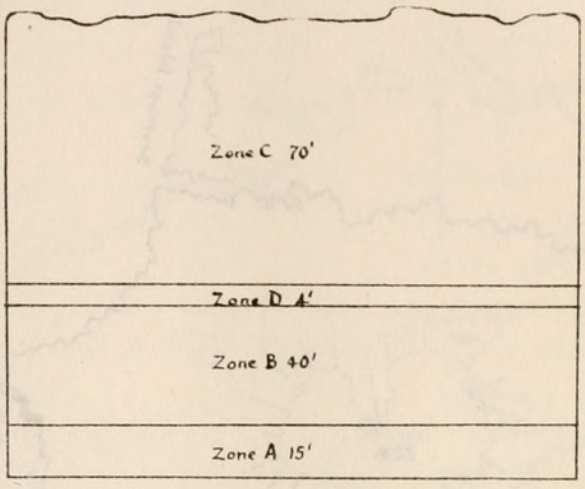

Fig. 3. Diagrammatic cross-section of beach-cliff exposure on Indefatigable Island, just south of Gordon Rocks.

Beneath zone *A* lava was found wherever the exposure could be seen.

This sedimentary series was observed to extend along the sea cliff of the northeast side of the island for many miles and undoubtedly would furnish additional fossils upon further search.

Seymour Island.—This island is actually a northern extension of Indefatigable, the present separation having been produced by recent faulting. The same or other earth movements produced a series of terraces and raised some old beaches above the sea. Fossils occur at several places as shown on the sketch map herewith but all seem to belong to the same period and are apparently not far from the same age as those found in the upper zone *(B* and *D)* of Indefatigable.

The usual landing on the island is about the center of the west side. Immediately to the southwest loose fragments of grayish rock are found scattered over the surface of reddish soil; these fragments contain fossils but most of them are so badly weathered they are of little value. The rocks are in

place along some of the sea cliffs, particularly on the southwest escarpment. Here the lower edge of the fossiliferous stratum at its highest point lies about 45 feet above the sea and is capped with a dense crystalline lava 12 to 15 feet thick. The fossil bed dips rather uniformly to the south at about 8°;

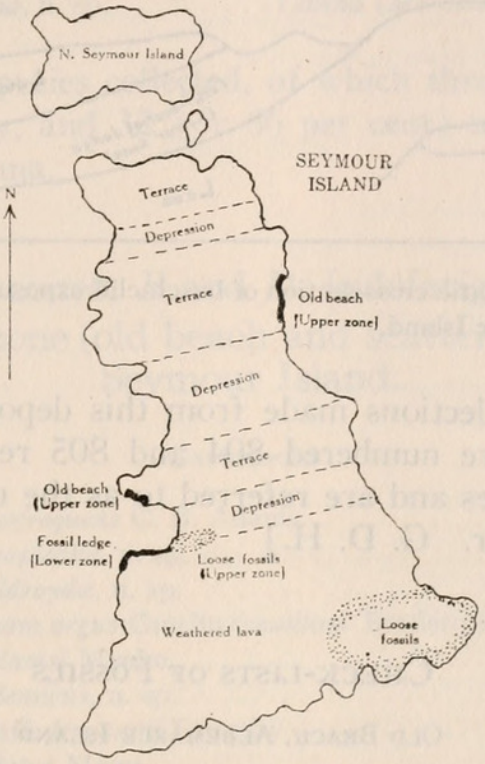

Fig. 4. Sketch map of Seymour Island showing location of various fossil-deposits believed to be Pliocene in age.

it gradually becomes thinner and is finally lost near sea level. Its greatest thickness is about eight feet. [This is referred to in the notes as the "fossil ledge." G. D. H.] The matrix is clear white, yellow and red beach sand. The upper 12 to 18 inches is very compact, almost crystalline from its contact with the lava flow. It was believed in the field that this stratum was somewhat older than that noted below and the fossils were kept separate. [Collections from this ledge are No. 806 of the Academy's paleontological series. G. D. H.]

Another fossiliferous locality is a small, old-beach area just to the west of the ledge mentioned and another is a small bight of the eastern shore. [See map.] The exposures are poor on account of the weathering of the sea cliffs but they

appeared to be about five feet thick. The scattered fossil-bearing rocks were supposed to be part of this "old beach" material because of the general crystalline texture and the fossils found. The old-beach exposure on the western sea cliff is not over 300 feet long and it can be traced inland about 200

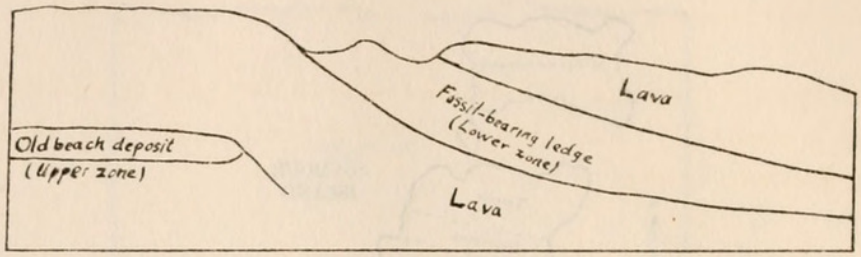

Fig. 5. Diagrammatic cross-section of beach-cliff exposure on the west side of Seymour Island.

feet. [The collections made from this deposit and the scattered masses are numbered 804 and 805 respectively in the Academy's series and are referred to as the upper or younger bed on Seymour. G. D. H.]

CHECK-LISTS OF FOSSILS

OLD BEACH, ALBEMARLE ISLAND

GASTROPODA

Acirsa albemarlensis, n. sp.
Alectrion versicolor, var. *nodocincta* C. B. Adams
Cancellaria emydis, n. sp.
Cantharus janellii Kiener
Colubraria pervaricosa, n. sp.
Conus academicus, n. sp.
Conus sp. aff. *fergusoni* Sowerby
Conus mahogani Reeve
Conus loomisi, n. sp.
Crepidula aculeata Gmelin
Crucibulum spinosum Sowerby
Cymatosyrinx zeteki, n. sp.
Cypræa albuginosa Mawe
Epitonium nesioticum, n. sp.
Fusinus dupetitthouarsi Kiener
Hipponix barbatus Gray
Malea ringens Sowerby
Mitra gausapata Reeve
Mitra lineata Swainson
Natica chemnitzii Pfeiffer
Oliva melchersi Philippi
Olivella inconspicua C. B. Adams
Phos cocosensis Dall
Phos sp. indet.
Polinices uber Valenciennes
Solarium granulatum Lamarck
Strombina recurva Sowerby
Terebra albemarlensis, n. sp.
Terebra galapagina, n. sp.
Terebra litorea, n. sp.
Trivia maugeriæ Gray
Trivia pacifica Gray
Trivia pulloidea, n. sp.
Vermicularia eburnea Reeve

PELECYPODA

Barbatia gradata Broderip
Barbatia reeveana Hanley
Barbatia solida Broderip & Sowerby
Chama exogyra Conrad
Chama phonea, n. sp.
Chione subrostrata Lamarck
Divaricella lucasana, n. sp.
Glycymeris gigantea Reeve
Ostrea megodon Hanley
Papyridea aspersa Sowerby
Pecten sp. aff. *slevini*, n. sp.
Psammosolen galapaganus Dall
Pteria sp. indet.
Tellina (*Macaliopsis*) *reclusa* Dall

Forty-eight species collected, of which three are indeterminable specifically, and 32 (or 66 per cent) are still living in the Panamic fauna.

B 2; upper zones, *B* and *D*, Indefatigable Island. C 2; upper zone (old beach and scattered fossils) on Seymour Island.

GASTROPODA

Acteocina infrequens C. B. Adams.....B 2
Alectrion tropicalis, n. sp.....C 2
Alectrion oldroydæ, n. sp.....B 2
Argobuccinum argus Gmelin (*vexillum* Broderip).B 2
Bullaria adamsi Menke.....B 2 C 2
Conus academicus, n. sp.....B 2
Conus sp. aff. *fergusoni* Sowerby.....C 2
Conus gradatus Mawe.....B 2
Conus miliaris Broderip, var.....C 2
Crepidula aff. *onyx* Sowerby.....B 2
Cymatium sp. aff. *tigrinus* Broderip.....B 2
Cypræa (young) aff. *cervinetta* Kiener.....C 2
Epitonium ennapleura, n. sp.....B 2
Epitonium implicatum, n. sp.....B 2
Epitonium innominatum, n. sp.....B 2
Fusinus dupetitthouarsi Kiener.....B 2
Fusinus panamensis Dall.....B 2
Latirus galapaganus, n. sp.....B 2
Latirus melvilli, n. sp.....B 2
Murex (*Phyllonotus*) *princeps* Broderip.....C 2
Nerita oligopleura, n. sp.....C 2
Neverita cf. *recluziana* Deshayes.....C 2
Neverita sp. ind.....B 2
Oliva, sp. indet.....B 2
Polinices cora Orbigny.....B 2
Polinices uber Valenciennes.....B 2
Solenosteira, sp. indet.....B 2

Strombina angularis Sowerby.....B 2
Strombina liopleura, n. sp.....B 2
Strombus propegracilior, n. sp.....B 2
Surcula insulæ, n. sp.....B 2
Tegula forbesi, n. sp.....B 2 C 2
Turbo agonistes, n. sp.....B 2 C 2
Turbo crenulatus Gmelin.....B 2
Turbo vermiculosus, n. sp.....B 2 C 2
Turritella goniostoma Valenciennes.....C 2
Vermicularis eburnea Reeve.....B 2

PELECYPODA

Anomia adamas Gray.....C 2
Anomia peruviana Orbigny.....C 2
Argina ? vespertina Morch.....B 2
Barbatia seymourensis, n. sp.....C 2
Chama sp.....C 2
Chione seymourensis, n. sp.....C 2
Chione, sp. indet.....C 2
Diplodonta, sp. indet.....B 2
Dosinia ponderosa Gray.....B 2
Ervilia galapagana, n. sp.....B 2
Jagonia galapagana Dall.....C 2
Jagonia mexicana Dall.....B 2
Lima ? nesiotes, n. sp.....C 2
Lucina spherica, n. sp.....B 2
Macoma (*Psammotreta*) *aurora* Hanley.....C 2
Macrocallista (cast) aff. *squalida* Sowerby .....C 2
Metis dombeyi Hanley.....C 2
Modiolus aff. *brasilianus* Lamarck.....C 2
Ostrea, sp. ind.....C 2
Pecten circularis Sowerby.....B 2
Pecten insulus, n. sp.....B 2
Pecten seymourensis, n. sp.....C 2
Pecten slevini, n. sp.....C 2
Pecten subnodosus Sowerby.....C 2
Pitaria callicomata ? Dall.....B 2
Pitaria, sp. indet.....B 2 C 2
Protothaca grata Say.....C 2
Protothaca sp. young aff. *thaca* Molina .....C 2
Pteria sp. ? .....C 2
Scapharca sp. aff. *labiata* Sowerby.....C 2
Scapharca multicostata Broderip.....B 2

Sixty-eight species of which 27 are still living, 23 are apparently new, and 18 are indeterminable.

B 1; lower, zone *A*, Indefatigable Island.
C 1; lower zone (fossil ledge) on Seymour Island.

GASTROPODA

Conus sp. aff. *fergusoni* Sowerby	C 1	
Conus indefatigabilis, n. sp.	B 1	
Fusinus dupetitthouarsi Kiener	B 1	
Sinum concavum Lamarck	B 1	C 1
Strombus, sp. indet.	B 1	

PELECYPODA

Codakia recta, n. sp.	C 1
Panope similaris, n. sp.	B 1
Pecten slevini, n. sp.	B 1
Pholadomya darwini, n. sp.	C 1

Nine species, of which two are still living, two are indeterminable, and five appear to be new.

DESCRIPTIONS OF NEW SPECIES

1. **Terebra albemarlensis** Dall & Ochsner, new species

Plate 2, figure 1

Shell acute, elongate, the apex defective, with about 18 remaining whorls; sculpture of the early whorls consisting of about 15 feeble axial riblets extending backward to the sutural band in front of which they expand into hemispherical bead-like nodules with less or subequal interspaces, forming a band in front of the sutural band; next the preceding suture is a broad obliquely nodulous spiral band; the whorl is distinctly constricted in the middle; this sculpture is gradually modified until on the later whorls we have a broad obliquely, axially wrinkled band in front of the very obscure suture separated by a deeply incised line from the anterior, nearly smooth part of the whorl which is contracted rather abruptly at the base; aperture defective, the outer lip thin, sharp, retractively arcuate in the middle as indicated by the lines of growth; body with a thin wash of callus, pillar short, rapidly attenuated, abruptly twisted, with a shallow sulcus inside the margin which in a perfect specimen may be keeled. Height (about

four whorls lost), 85 mm; of last whorl, 23 mm.; maximum diameter, 15 mm.

Holotype: No. 2894; *paratypes:* Nos. 2895, 2896, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

In a fragment, probably of the same species, the nucleus is slightly oblique to the axis and comprises about three irregular, smooth, polished, inflated whorls, succeeded by about eight nearly smooth whorls with a plain sutural band set off from the whorl by an incised line; only after these does the sculpture above described begin. If the identification is correct, this would give the type specimen 24 whorls exclusive of the nucleus. The changes in the sculpture during growth are quite remarkable. This species is perhaps nearest to *T. variegata* Gray, now living in the Gulf of California.

2. **Terebra galapagina** Dall & Ochsner, new species

Plate 2, figure 2

Shell elongate, acute, slender, solid, with 14 whorls exclusive of the (lost) nucleus which from the fragment remaining was smooth and polished; sculpture strong, axially composed of (on the last whorl 16) strong, slightly sigmoid ribs, extending over the entire whorl, with narrower interspaces, conspicuously swollen just in front of the inconspicuous suture, the series giving the effect of a band of nodules; in front of these the whorl is somewhat constricted, most strongly on the earlier whorls; spiral sculpture of (on the last whorl 11, between the sutures five) incised lines with wider flattish interspaces cutting the ribs in front of the sutural band of nodules; at the posterior margin of the base the space between these lines inclines to be somewhat nodulose on the ribs; in front of these are two or three more similar lines, while the surface of the canal is marked only by incremental lines; aperture narrow, canaliculate at the posterior commissure; outer lip thickened when it coincides with a rib, internally smooth, not lirate; on the body and inner lip a moderate deposit of callus; canal short, wide, recurved, the pillar without a keel or sulcus, the siphonal fasciole inconspicuous. Height, 35 mm.; maxi-

mum diameter of last whorl, 7 mm.; height of last whorl, 13 mm.

Holotype: No. 2897; *paratypes:* Nos. 2898, 2899, 2900, 2901, 2902, 2903, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

This species is nearest to the recent *T. armillata* Hinds, which ranges from Magdalena Bay, Lower California (where it is also found as a post Pliocene fossil) to the Gulf of Panama.

3. **Terebra litorea** Dall & Ochsner, new species

Plate 2, figure 3

Shell elongate, acute, with 15 slightly constricted flat-sided whorls beside the (lost) nucleus; suture distinct, sculpture in general feeble; on the apical whorls the axial sculpture consists of (on the sixth whorl about 12) rounded straight ribs extending from suture to suture with a raised nodulous spiral band in front of the suture and five or six fine spiral threads on the rest of the whorls, evenly spaced and over riding the ribs; on the subsequent whorls the ribs become narrower, sharper, and more numerous, crossing the subsutural band, the nodules disappear, the spiral threads become wider and flattened with much narrower interspaces, the axial ribs flexuous (about 33 on the last whorl), and continuous over the whole whorl; the base is rounded, constricted toward the canal; the aperture subrectangular, narrower than high; the body with a thin coat of enamel; pillar strong, twisted, with two sharp spiral plaits of which the posterior is carried outside the aperture as a sharp keel behind the siphonal fasciole; canal rather long, narrow and recurved. Height of shell, 56 mm.; of last whorl, 21 mm.; maximum diameter, 13 mm.

Holotype: No. 2904, Mus. Calif. Acad. of Sci., collected by W. H. Ochsner, March 3, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

This species is nearest to the recent *T. specillata* Hinds, of the west coast of America from the Gulf of California to the Bay of Panama.

4. **Conus indefatigabilis** Dall & Ochsner, new species

Plate 2, figure 4

Shell rather large, of about 10 whorls, the nucleus lost, the suture excavated, without spiral sculpture, the shoulder in the early whorls with a cord-like keel which becomes sharper in the later ones; the anal sulcus deep, the suture appressed, and the whorl between the shoulder and the suture sculptured with concentric lines in harmony with the sulcus; anterior portion of the whorl straight-sided, rapidly attenuated, a slight convexity near the shoulder; surface smooth except a few spiral sulci near the anterior end. Height, 57 mm.+; height of last whorl, 50 mm.+; maximum diameter at the shoulder, 34 mm.

Holotype: No 2905; *paratype:* No. 2906, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from lowermost horizon (zone A) on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species is perhaps nearest to *Conus regularis* Sowerby living from the Gulf of California to Panama.

5. **Conus academicus** Dall & Ochsner, new species

Plate 2, figure 5

Shell of moderate size with an acute apex and slightly concave sides to the spire, with about eight whorls excluding the (lost) nucleus; suture distinct, not channelled or turrited; surface between the sutures axially sculptured with hardly curved, close-set incremental lines and very slightly excavated; shoulder rounded, surface in front of the shoulder two-thirds of the distance toward the anterior end smooth, slightly convex; the anterior third sculptured with distant grooves, the interspaces wider and smooth, the grooves becoming closer and more channelled anteriorly, about four on the body and six or seven more crowded on the region of the canal; aperture long and narrow, the inner lip smooth, the canal short, straight, and as wide as the aperture behind and hardly differentiated from it. Height of shell, 31 mm.; of aperture, 25 mm.; maximum diameter at the shoulder, 16 mm.

Holotype: No. 2907; *paratypes:* Nos. 2908, 2909, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

6. **Conus loomisi** Dall & Ochsner, new species

Plate 2, figure 6

Shell of moderate size, solid, with a slightly concave, acute spire, and about 12 whorls exclusive of the (lost) nucleus; suture distinct, whorls between the sutures excavated, marked only with concavely retractive inceremental lines, corresponding to a sulcus at the aperture; shoulder well marked but rounded; body in front of the shoulder with slightly convex sides, constricted somewhat behind the canal; sculpture of the posterior half of the body obsolete, consisting of very narrow incised lines with much wider flat interspaces; on the anterior half of the body these lines gradually become wider excavated channels, numbering about eight on the canal, which in the adult has a marked siphonal fasciole, there being three or four more grooves; aperture narrow, wider anteriorly; canal deep, wide, very slightly recurved. Height, 44 mm.; height of last whorl, 38 mm.; diameter at shoulder, 22 mm.

Holotype: No. 2910; *paratypes:* Nos. 2911, 2912, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906. 1¼ **miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

The recent shell which most nearly approaches this is *Conus lucidus* Mawe, which occupies the same region at present. This is a shorter and more stumpy shell with less conspicuous sculpture.

The species is named for Mr. Leverett Mills Loomis who was Director of the Museum of the California Academy of Sciences at the time the Galapagos Expedition was organized.

Several localities produced undeterminable cones, one large one especially which by its size and outline recalled *C. fergusoni* Sowerby, from the Gulf of Panama.

7. **Surcula insulæ** Dall & Ochsner, new species

Plate 6, figure 12

Shell acutely fusiform, with about three smooth inflated nuclear and seven subsequent sculptured whorls of which the last is longer than the spire; axial sculpture of (on the penultimate whorl about 10) obscure wide ribs, with subequal interspaces, the ribs stronger on the early whorls and obsolete on the last whorl, and chiefly conspicuous on account of the swelling at the intersections of the spiral sculpture; suture widely appressed, the band sculptured by the concave incremental lines of the anal sulcus; spiral sculpture on the early whorls of two strong cords swollen where they over ride the ribs, the posterior cord slightly stronger; between it and the sutural band two smaller threads; whorl constricted behind the shoulder; on the last turn the ribs are indicated only by keeled elongate nodules of the major spiral; in front of the shoulder are about 22 flattish threads extending to the canal, mostly with narrower interspaces, undulated by axial irregularities of growth which almost approach a minor variety of ribbing, and occasionally a little nodulous at the intersections; aperture long and narrow, outer lip simple, thin, only moderately produced; anal sulcus close to the suture, about semicircular; body and inner lip erased, smooth, canal rather wide, somewhat twisted, and anteriorly attenuated. Height of shell, 26 mm.; of last whorl, 17 mm.; of aperture and canal, 13 mm.; maximum diameter, 8 mm.

Holotype: No. 2913, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species belongs to the group of the recent *S. maculosa* Sowerby, which ranges from the Gulf of California to Peru.

8. **Cymatosyrinx zeteki** Dall & Ochsner, new species

Plate 6, figure 13

Shell small, rather acute, with a smooth blunt nucleus of about three turns and nine subsequent whorls; aperture about one-third of the total length; whorls slightly convex, con-

stricted by the anal fasciole; sculpture of (on the penultimate whorl 10, on the last whorl 14) nearly straight axial, stout, rounded ribs, crossing the whorls, and crowded together with very narrow interspaces, obsolete on the canal; aperture semilunate; outer lip produced anteriorly; anal sulcus short, wide, with a flaring margin; inner lip with a rather thick smooth layer of enamel; canal short, wide, with an inconspicuous fasciole. Height of shell, 20 mm.; of last whorl, 11 mm.; of aperture, 8 mm.; maximum diameter, 7.5 mm.

This shell belongs to the smooth, prominently ribbed group of which the recent Antillean *C. æpynota* (Dall), is an example, and approaches the recent Galapagan species, *C. roseotincta* (Dall).

Holotype: No. 2914; *paratype:* No. 2915, Mus. Calif. Acad. Sci., collected by W. H Ochsner, March 5, 1906. **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

The species is named for Mr. James Zetek, who has made extensive collections in the Panamanian region.

9. **Cancellaria emydis** Dall & Ochsner, new species

Plate 2, figure 7

Shell small for the genus, acute, plump, the aperture longer than the spire, with a small turbinate smooth nucleus of about 3½ whorls and 4½ subsequent whorls; axial sculpture of (on the penultimate whorl 13) sharp, narrow ribs crossing the entire whorl with a slight obliquity, separated by wider, excavated but not channelled interspaces, and crossed by (on the last whorl 12) narrow prominent cords, of which the two in front of the suture are more prominent and widely separated than the others; this reticulation extends over the whole shell, the cords being slightly swollen but not nodulous at the intersections; aperture oblique, sublunate, rather narrow, with nine or ten lirations within the thin, not expanded outer lip which is slightly crenulated in the specimen by the external sculpture; body with a subsutural callous ridge and shallow sulcus; pillar straight, callous, with three marked plaits, diminishing in size anteriorly behind the pillar; the inner lip has a thick smooth layer of enamel; siphonal fasciole strong; be-

tween it and the callosity of the pillar a narrow umbilical chink; canal inconspicuous but rather deep. Height of shell, 23 mm.; of last whorl, 17 mm.; of aperture, 14 mm.; maximum diameter, 15 mm.

Holotype: No. 2916; *paratype:* No. 2917, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

This belongs to the typical section of the genus, and the nearest recent representative on the Pacific coast is *C. ventricosa* Hinds, which does not approach it very closely; the Antillean species is more similar.

10. **Latirus melvilli** Dall & Ochsner, new species

Plate 6, figure 10

Shell small, of about nine whorls, including a minute smooth nucleus of about three whorls; sculpture succeeding the nucleus, minutely reticulated, developing later axially into (on the earlier whorls some 15, on the last whorl 10) rounded ribs, on the early whorls extending from suture to suture, later obsolete between the suture and the shoulder, and on the last whorl also on the base; these ribs are prominent, almost angular on the last two whorls at the shoulder, but not so on the earlier turns; the suture is distinct but not appressed; between it and the shoulder are three spiral cords with wider interspaces in which run much smaller threads; between the shoulder and the canal are about 14 similar or sharper spiral cords with three or four threads in each interspace; the canal is also spirally threaded; threads and cords except at the shoulder, not enlarged at the intersections with the ribs; aperture semilunate, not internally lirate and with no substantial callus in the specimens (which however may not be completely mature); pillar with two or more feeble plaits; canal short, wide, slightly recurved, with an inconspicuous siphonal fasciole. Height, 24 mm.; of last whorl, 16 mm.; maximum diameter, 11 mm.

Holotype: No. 2919; *paratype:* No. 2920, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, No-

vember 17, 1905, from upper horizon (zone D) on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

Named in honor of J. Cosmo Melvill, Esq., who has monographed the recent species of the genus.

11. **Latirus galapaganus** Dall & Oschner, new species

Plate 2, figure 8; plate 6, figure 9

Type specimen unique and rather imperfect, decollate but retaining four whorls separated by a distinct but not appressed suture; upper whorl sculptured by vertical, narrow, axial ribs about three-quarters of a millimeter apart, and reaching from suture to suture; these are crossed by six or seven obscure flattish spirals with subequal interspaces, not swollen at the intersections; two or three spirals near the preceding suture are stronger than the rest; this sculpture becomes more feeble in the succeeding whorls, and on the last whorl, behind an obscure shoulder, only two or three faint spirals are discernible; the ribs, though obscure, appear chiefly as feeble nodulosities near the shoulder of the last whorl; aperture semilunate, defective, a thin callus on the body; pillar with one major posterior and two minor anterior plaits; base slightly constricted behind the canal. Height of specimen, 27 mm.; of last whorl, 20 mm.; of aperture (approximately), 14 mm.

Holotype: No. 2918, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

Although the specimen is imperfect, it is clearly not referable to any of the recent species of the region.

12. **Colubraria pervaricosa** Dall & Ochsner, new species

Plate 6, figure 11

Shell small with a minute, turbinately coiled, smooth, polished nucleus of about three whorls; apex acute, whorls somewhat convex, the last more than half the length of the shell; axial sculpture of (on the penultimate whorl about 15) slightly retractively arcuate ribs, rounded, with subequal interspaces,

and crossing the entire whorl; suture distinct, somewhat appressed; spiral sculpture of numerous rounded small threads, close-set and somewhat roughened by the incremental lines, subequal and covering the whole shell, not swollen where they pass over the ribs; aperture rather narrow, outer lip much thickened forming a swollen varix, not reflected, internally with five strong subequal lirations, a small deep subsutural sulcus; inner lip callous, the outer edge forming a raised lamina; base rounded, anteriorly constricted; canal short, deep, slightly recurved. Height of shell, 18 mm.; of last whorl, 10 mm.; maximum diameter 6.5 mm.

Holotype: No. 2921, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

This shell belongs to the group of which the type (by elimination) should carry the name of *Fusus* Helbling, not Lamarck. The adoption of this name, however, would involve such confusion that we hesitate to use it.

This species is not distantly related to the forms found in the Antilles, as well as many of other parts of the world, but less distantly to the characteristic Indo-Pacific larger forms of the group.

13. **Strombina ? liopleura** Dall & Ochsner, new species

Plate 6, figure 7

Shell small, strongly sculptured, with about five whorls, the nucleus short, smooth, depressed, of about a whorl and a half; axial sculpture of a variable number (12 to 19) of nearly straight rounded ribs, more or less swollen just in front of the suture in the later whorls, with a stout varix close behind the outer lip; on the base and canal these are crossed by more or less developed spiral threads not swollen at the intersections and which in some cases may be represented behind the periphery on the last whorl; the earlier whorls are usually quite smooth and the suture distinct but not channelled; aperture elongate-quadrate, outer lip sharp, (the throat obscured by matrix); inner lip with a relatively thick layer of

enamel and produced and slightly twisted canal. Height of shell, 7 mm.+; of last whorl, 5 mm.+; maximum diameter, 3 mm.

Holotype: No. 2922; *paratypes:* No. 2923, 2924, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species is represented by more or less imperfect individuals and may perhaps be an elongate *Anachis,* but its general aspect recalls the sculptured Strombinas.

14. **Alectrion tropicalis** Dall & Ochsner, new species

Plate 2, figure 9

Shell large, with a very acute spire of about 10 whorls, of which two are included in a minute, smooth, compactly coiled, and polished nucleus; succeeding whorls evenly reticulated by six or eight narrow strap-like threads which over run low thread-like axial riblets; the spiral sculpture later becomes attenuated and on the last turn obsolete but still covering the entire whorl; suture distinct, appressed only on the last whorl which develops about 18 irregular slightly oblique, low ribs, prominent only at the angle of the shoulder which they feebly coronate; space between the suture and the shoulder slightly constricted; aperture wide, subquadrate, outer lip thin, body erased; pillar short with a keel at its edge; siphonal fasciole distinct, bounded behind by a sharp low keel; siphonal sulcus deep. Height of shell, 43 mm.; of last whorl, 30 mm.; of aperture, 22 mm.; maximum diameter, 23 mm.

Holotype: No. 2925, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, November 21, 1905, from **upper horizon, Seymour Island, Galapagos Group.** Probably Pliocene.

This fine species belongs to the group so well represented in the California Pliocene and recent faunas and called by Conrad *Schizopyga.*

15. **Alectrion oldroydæ** Dall & Ochsner, new species

Plate 2, figure 10; plate 6, figure 8

Shell large, with 6½ whorls beside the (lost) nucleus; spire acute, whorls rapidly enlarging; suture distinct, not channelled or appressed; whorls evenly rounded; apical whorls evenly reticulated with spiral and axial small cords, the interspaces about equal; as the whorls increase the axial sculpture becomes fainter and on the last whorl obsolete; on the penultimate whorl the spirals behind the shoulder number about six and the same in front of it, the latter become wider and flatter with narrower channelled interspaces, the major spirals numbering about 12 with smaller and closer threads behind the shoulder and near the canal; aperture about half as long as the whole shell; outer lip thin, entire, slightly expanded; inner lip free from callosity; pillar slightly concave with a strong fold bordering the short and recurved canal; siphonal fasciole inconspicuous, bordered behind by a low keel but no deep sulcus; canal wide, rather deeply excavated. Height, 34 mm.; of aperture, 17 mm.; maximum diameter of last whorl, 18.5 mm.

Holotype: No. 2926, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species is allied to the recent group containing *A. perpinguis* Hinds, and *A. mendica* Gould, of the California coast, but so far as known there are no species analogous to it in the present fauna of the islands. It is named in honor of Mrs. Ida S. Oldroyd who has worked on the fossil species of the genus in California.

16. **Acirsa albemarlensis** Dall & Ochsner, new species

Plate 6, figure 4

Shell small, slender, acute, (the nucleus lost) with about eight rounded adherent whorls crossed by low blunt axial lamellæ (more than 30 on the last whorl) not continuous over the suture and slightly flexuous; spiral sculpture of numerous equal and equidistant fine raised threads not crossing the

varical lamellæ but slightly crenulating them; base imperforate, rounded; aperture rounded. Height of shell, 10.5 mm.; of last whorl, 5.0 mm.; maximum diameter, 4.0 mm.

Holotype: No. 2927, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

This species like some of the others, recalls forms of the recent Antillean fauna rather than any yet reported from the Pacific coast.

17. **Epitonium nesioticum** Dall & Ochsner, new species

Plate 6, figures 5, 6

Shell small, acute, with a small polished smooth nucleus and seven or eight more rounded adherent whorls; axial sculpture of (on the last whorl 13) sharp lamellose varices, mostly subequal and equally spaced, but with an occasional thicker one, indicating a resting stage; the varices just in front of the suture have a small projecting angle; spiral sculpture of numerous fine sharp threads, equal and equidistant, with slightly wider interspaces, not crossing nor crenulating the varices; final varix thickened and slightly reflected; base rounded, centrally depressed but imperforate. Height of shell, 7.5 mm.; of last whorl, 3.5 mm.; of aperture, 2.2 mm.; maximum diameter, 3.3 mm.

Holotype: No. 2928; *paratypes:* No. 2929, 2930, 2931, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northwest of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

This species belongs to the recent group of the genus which is typified on the California coast by *E. bellastriatum.*

18. **Epitonium implicatum** Dall & Ochsner, new species

Plate 6, figure 1

Shell slender, with about 12 evenly rounded whorls, the suture deep but the whorls adherent and with no basal disk or cord; surface smooth, polished, crossed obliquely by 13 low, narrow, lamellose varices continuous over the whole

spire and a little expanded at the suture; in the course of their length they make at least a half turn of the spire, the anterior end lagging; base rounded, imperforate; the aperture subcircular, oblique. Apex defective, length of seven whorls, 18 mm.; maximum diameter, 6 mm.

Holotype: No. 2932, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east side of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species belongs to the type of a group which is represented in the recent and Tertiary fauna of the West Indies, but which has not yet been reported from the Pacific coast of the Americas.

19. **Epitonium ennapleura** Dall & Ochsner, new species

Plate 6, figure 2

Shell small, acute, slender, smooth, with more than eight rounded, barely adherent whorls (the nucleus lost) crossed by nine thin and lamellose oblique continuous varices, slightly acuminate at the shoulder, and making about a third of a turn about the spire; suture very deep; aperture ovate; base rounded, imperforate, without a disk or encircling cord. Length of specimen, 10.3 mm.; maximum diameter, 3.2 mm.

Holotype: No. 2933, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This form of *Epitonium* is common to both coasts of tropical and warm temperate America.

20. **Epitonium innominatum** Dall & Ochsner, new species

Plate 6, figure 3

Shell small, slender, acute, the nucleus lost but retaining seven whorls with indications of one or two more; whorls moderately rounded, adherent, with a deep suture and no basal disk or cord; they are obliquely crossed by nine low narrow lamellose varices continuous over the spire and mak-

ing about one third of a turn around it, with no noticeable expansion at the suture, the anterior end lagging; as the shell approaches maturity one or two of the varices are slightly expanded, thickened and concentrically striated on their anterior faces; these doubtless represent resting stages; base rounded, imperforate. Length of specimen, 9.5 mm.; maximum diameter, 3.3 mm.

Holotype: No. 2934, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species belongs to the same group in the genus as the preceding.

21. **Trivia pulloidea** Dall & Ochsner, new species

Plate 6, figures 16, 17

Shell small, solid, the dome of the back nearer the posterior end, giving the shell when viewed from above a pyriform outline; posterior end broadly rounded, anterior end attenuated, base moderately marginate above, crenulated by the ribs; beginning at the anterior end 17 cord-like ribs passing over the dome without interruption can be counted, but on the posterior slope the ribs are smaller and somewhat obscure in the specimen; base convex, depressed toward the aperture with about 12 strong cords continued into the aperture on the left side, the right lip is narrower and the cords less conspicuous; the siphonal sulcus is ample. Height, 5 mm.; length, 8 mm.

Holotype: No. 2935, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

This somewhat resembles *T. pulla* Gaskoin, of the recent Gulf of Panama and Galapagos fauna, but differs in details.

In the upper zone on Seymour Island an immature shell was collected which, if not the larger *Cypraea cervinetta* of Kiener, at least must have been extremely similar to it, and adds another very characteristic Middle American type to the Galapagos fauna.

22. **Strombus propegracilior** Dall & Ochsner, new species

Plate 2, figure 23

Shell solid, of more than seven whorls (apex defective) with a rather acute spire, the last two whorls comprising the bulk of the whole shell; surface smooth except that the whorls carry at the shoulder eight stout, short, radiating spines; suture appressed and undulated, the space between it and the shoulder in front slightly excavated; whorl in front rapidly attenuated, conic, with a strong siphonal fasciole; canal defective but evidently recurved; inner lip smooth, outer lip defective; body with a thin callus; the spines appear on the apical whorls chiefly as nodules. Height of shell, 80+ mm.; of last whorl 65+ mm.; of aperture, 55 mm.; maximum diameter, 45 mm., not including the spines.

Holotype: No. 2936, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species approaches the recent *Strombus gracilior,* which ranges from the Gulf of California to Panama Bay.

23. **Nerita oligopleura** Dall & Ochsner, new species

Plate 2, figure 11; plate 6, figure 15

Shell of moderate size, very solid and heavy, retaining traces of three wide blackish color bands on a lighter ground; apex flattened, the number of whorls obscured by erosion; sculpture of three or four wide, strong, low, spiral ridges with subequal interspaces, the basal one more distant and obscure; these are crossed by irregular sulci apparently due to inequalities of growth and possibly not specific; the general surface is more or less minutely pitted, a condition perhaps due to fossilization; aperture wide, semilunate, with a shallow sulcus at the upper commissure; inner lip broad, callous, apparently minutely granulose, the inner margin with three feeble denticulations near the middle; outer lip thick, showing no liration or denticulation in the specimen. Height, 14 mm.; maximum diameter, 18 mm.

Holotype: No. 2937, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, November 21, 1905, from **upper horizon, Seymour Island, Galapagos Group.** Probably Pliocene.

No species at all like this is reported from the recent fauna of the region.

24. **Turbo vermiculosus** Dall & Ochsner, new species

Plate 2, figure 15

Shell small for the genus, unusually elevated, with more than four rounded whorls somewhat constricted in front of the sutural border; suture distinct, very narrowly channelled; spiral sculpture of (on the penultimate whorl three, on the last whorl six) strong broad low ridges with smaller intercalary threads and obscure minute intervening threads, the interspaces almost channelled and two ridges of the secondary size on the base; axial sculpture of incremental lines sometimes minutely, imbricately lamellose; in addition the entire surface is minutely vermiculately granulous and punctate; base rounded, imperforate with an irregular thickened ridge behind the inner lip; aperture subcircular with a strong subsutural ridge but no internal liræ; body with a thin layer of enamel. Height about, 34 mm.; of last whorl, 26 mm.; maximum diameter, 25 mm.

Holotype: No. 2938, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, November 21, 1905, from **upper horizon, Seymour Island, Galapagos Group.** Probably Pliocene.

The curious surface sculpture separates this species from any of the recent forms of the region belonging to the genus *Turbo*. The absence of an operculum makes its reference to the proper subdivision of the genus impracticable.

25. **Turbo agonistes** Dall & Ochsner, new species

Plate 2, figures 12, 16

Shell small for the genus, heavy, solid, of about five rapidly enlarging whorls; nucleus defective but blunt and small; whorls flattened behind the shoulder, the suture distinct, undulated by the sculpture, usually with a row of small round nodules in front of it like a string of beads; the shoulder

with from seven to nine short stout conspicuous spines, from these extend obscure ridges obliquely to the margin of the base where they rise into smaller stout pointed nodules, and again appear arching round the umbilical region as a row of still smaller, eroded and irregular nodules; the other axial sculpture is of oblique, rather rude, sometimes lamellose, incremental lines; spiral sculpture of three or four obscure threads between the two anterior rows of nodules, and obsolete traces of spiral sculpture on the other interspaces, more evident on the upper whorls, and which is some mutations of the species may be much more conspicuous; beside this there is a very minute granulation over the whole unworn surface, but only visible under magnification; aperture circular except where the outer lip is modified by the external sculpture; base imperforate, pillar lip arcuate, callous, with a small anterior projection as in most Turbos; aperture shorter than the spire. Height of spire, 25 to 31 mm.; of aperture, 10 to 16 mm.; maximum diameter, 23 to 28 mm.

Holotype: No. 2939; *paratype:* No. 2940, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This interesting species is not closely approached by any of the recent forms of the region.

26. **Tegula forbesi** Dall & Ochsner, new species

Plate 2, figure 13

Shell trochoid, solid, subconic, with about five hardly convex whorls, excluding the (lost) nucleus; suture distinct, narrow, channelled; spiral sculpture of strong, flattened, close-set ridges, seven above the basal margin and five on the base, the suture running at the basal margin; these are obliquely crossed by basally retractive rather strong incremental lines, tending occasionally to cut the spirals into obscure nodules, especially the one just in front of the suture; in general however the lines are crowded and the spiral interspaces sublamellose; the ridges sometimes carry a medial groove; basal margin bluntly rounded, base flattish, with a rather wide

umbilical opening, margined by a rounded cord outside of which is a rather conspicuous sulcus with a smooth space between it and the spiral sculpture of the base; aperture oblique, the outer lip not thickened but crenulate in harmony with the external sculpture; body with a thin layer of enamel; pillar deeply excavated, short, evenly rounded to meet the basal lip; there are no internal lirations. Height of shell, 21.5 mm.; of last whorl, 16 mm.; maximum diameter, 23 mm.

Holotype: No. 2941; *paratype:* No. 2942, collected by W. H. Ochsner, November 21, 1905, from upper horizon on **Seymour Island, Galapagos Group.** Probably Pliocene.

This species is most nearly related to the recent *T. aureotincta* Forbes of California.

27. **Arca (Barbatia) seymourensis** Dall & Ochsner, new species

Plate 2, figure 18; plate 4, figure 5

Shell compressed, inequilateral, somewhat irregular, somewhat rounded and attenuated in front; beaks low near the anterior end; disk constricted widely below the beaks; posterior dorsal margin arcuate, expanded, compressed, posterior end subtruncate, with a ridge extending from each angle of the truncation to the beaks, the space between the ridges depressed; basal margin concavely arcuate at the vicinity of the constriction above referred to; sculpture of radial, flattish cords, with subsequent channelled interspaces, coarse toward the ends of the shell and on the posterior ridges more or less irregularly lamellate or subspinose; the radial sculpture crossed by more or less irregular, sometimes coarse, incremental lines; area above the hinge with two deep angular sulci; hinge with numerous minute teeth, a few at each end larger and more oblique; pallial line distinct, inner margin of the valve entire. Length of shell, 35 mm.; beaks behind the anterior end, 10 mm.; height at beaks, 18 mm.; maximum diameter, 14 mm.

Holotype: No. 2943; Mus. Calif. Acad. Sci., collected by W. H. Ochsner, November 21, 1905, from upper horizon on **Seymour Island, Galapagos Group.** Probably Pliocene.

This is quite near *Arca reeveana* Hanley, but has the sculpture behind the beaks coarser and lamellose. It is of the type of a group common to the east and west coasts of Central America.

28. **Pecten (Pecten) slevini** Dall & Ochsner, new species

Plate 3, figure 9; plate 4, figure 4

Shell large, right valve inflated, left valve flattish, medially somewhat concave; hinge-line short, overhanging that of the left valve; posterior ear arched, with low concentric lamellation, and two or three feeble indications of radial ridges; anterior ear flatter with closely crowded lamellæ and four or five rather strong radial riblets; this ear is separated by a deep groove from the disk; the ctenolium, if any, is defective in the specimens; right valve with 17 prominent rounded ribs, with wider, not channelled, interspaces; the posterior submargin is narrow, with two or three feeble radial riblets; the whole surface is over run with undulate equal and equally spaced low fine concentric lamellæ with about equal interspaces; the left valve has 15 ribs with similar sculpture and similar posterior submargin; hinge-plate with a large deep resiliary pit and in the right valve three anterior and two (?) posterior, strongly cross-striated radial ridges of which the dorsal is the longer; basal margin defective, but internally grooved. Estimated height, 70 mm.; width, 80 mm.; maximum diameter, 26 mm.; length of hingeline, 39 mm.

Holotype: No. 2944; *paratype:* No. 2945, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species is quite close to the Pliocene *P. hemphillii* Dall, from Pacific Beach near San Diego, California; but apparently not so near any of the typical Pectens of the Panama region.

The species is named for Mr. Joseph R. Slevin, a member of the expedition of 1905-1906.

29. **Pecten insulus** Dall & Ochsner, new species

Plate 2, figures 19, 20

Shell small, sharply sculptured, convex, with 16 flattish radial ribs separated by subequal interspaces; the ribs are depressed and rounded at the sides and the interspaces not channelled; submargins deeply impressed, concentrically striated, anterior ear with four or five rather strong radial ribs concentrically, prominently lamellose; concentric sculpture covering the whole disk of close-set rather thick, flattish threads not obsolete on top of the ribs and not tending to be sharp or lamellose; interior grooved in harmony with the ribbing; both valves (?) apparently similarly sculptured. Height. 17 mm.; width, 18 mm.; diameter about, 12 mm.

Holotype: No. 2946; *paratype:* No. 2947, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This species recalls some of the Oligocene Antillean species, but its sculpture is characteristic. Both the specimens were filled with matrix and the posterior ears wanting.

30. **Pecten seymourensis** Dall & Ochsner, new species

Plate 2, figure 22

Shell rather large, ovate, moderately inflated, solid; right valve with a rather short hinge-line and narrow submargin; anterior ear short (defective), posterior longer, radially sculptured with small threads, submargin with obsolete similar sculpture; hinge rather feeble with a moderately large shallow resiliary pit; external sculpture of 18 squarish, dorsally smooth and flat, radial ribs, with narrower channelled interspaces concentrically, finely lamellose; interior obscured by matrix, basal margin internally grooved in harmony with the external ribbing. Height, 57 mm.; breadth, 53 mm.; diameter of right valve, 12 mm.

Holotype: No. 2948; *paratype:* No. 2949, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, November 21, 1905, from

upper horizon, **Seymour Island, Galapagos Group.** Probably Pliocene.

This species belongs to the group of *P. purpuratus* Lam., but is sufficiently distinct. The left valve was not obtained.

31. ? **Lima nesiotes** Dall & Ochsner, new species

Plate 3, figures 2, 3

Shell large, subovate, radiately sculptured, solid; radial ribs 16, low broad, smooth on the back, separated by narrower interspaces which are crossed by low, close-set, minute imbrications; submargins as broad as two ribs and smooth; anterior ear narrow, smooth, the margin slightly concave for the gape of the valves; posterior ear shorter, narrow with three or four faint radial threads; hinge with a large resiliary pit of which the margins are prominent; interior grooved in harmony with the ribs near the base, the grooves narrow with wider slightly concave interspaces. Height, 48 mm.; width, 42 mm.; diameter of right valve, 7.5 mm.

Holotype: No. 2955; *paratypes:* Nos. 2950-2954, 2956, 2957, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, November 21, 1905, from upper horizon, **Seymour Island, Galapagos Group.** Probably Pliocene.

This species seems to belong in the group of *L. halensis* Dall, from the Oligocene of southern Georgia, but has more ribs and a less elongate form. Both differ from the recent Limas in the absence of imbricating sculpture or spines on the back of the ribs. Both have an aspect somewhat inclining toward that of *Chlamys*, and the present species may possibly be an aberrant *Chlamys* though *L. halensis* certainly belongs to the genus *Lima*.

A specimen of *Pteria* was collected on Seymour Island (zone not stated on the label) which differs from any species known to us by its extreme inflation. It is not in a sufficiently good condition for description, but doubtless represents a new species.

32. **Codakia recta** Dall & Ochsner, new species

Plate 4, figure 1

Shell large, heavy, rounded, nearly equilateral, with inconspicuous beaks, over a very small rounded impressed lunule; anterior end evenly rounded from the beaks, posterior end convexly arcuate forming an obscure angle at its junction with the evenly rounded base; ligament sunken, escutcheon obsolete; sculpture of rather wide flattish radials, retractively arcuate, extending over the whole disk, separated by much narrower channelled interspaces, the radials with a median groove near the base; in the middle of the disk there are about six radials in the space of ten millimeters, but they are narrower and more crowded toward the posterior submargin; these are crossed by numerous regular close-set concentric threads, about three to a millimeter, and a few pronounced concentric sulci indicating resting stages. The interior of the shell is obstructed by matrix. Height, 83 mm.; length 86 mm.; diameter, 32 mm.

Holotype: No. 2958, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, November 21, 1905, from lower horizon, **Seymour Island, Galapagos Group.** Probably Pliocene.

The nearest relation of this species is *Codakia distinguenda* Tryon, which ranges from the Gulf of California to Panama Bay. The latter has a much deeper and larger lunule and more evident escutcheon, while it is rounder behind and with the hinge line on each side of the beaks more horizontal.

33. **Lucina spherica** Dall & Ochsner, new species

Plate 3, figure 8; plate 4, figures 2, 7

Shell orbicular, moderately inflated, slightly inequilateral, thin, beaks low, small, prosocœlous over an extremely minute narrow lunule, not much impressed and having the portion of the lunule in the right valve longer and less deep than that in the left valve; anterior submargin compressed, arcuate, semilunate, posterior submargin more sharply defined, longer, narrower, and with the ligament deeply set in between the

dorsal margins; sculpture of fine close-set low lamellæ, like exaggerated incremental lines, over the whole disk, near the base with more or less, hardly perceptible fine radial lineation; beaks slightly nearer the anterior end; interior more or less radially striate or granulose within the pallial line; anterior adductor scar smaller than the posterior, with a long narrow prolongation within the pallial line; hinge plate edentulous; basal margins simple, entire, sharp. Height, 50 mm.; length, 53 mm.; beaks behind the anterior end, 25 mm.; maximum diameter, 25 mm.

Holotype: No. 2959 A and B; *paratypes:* Nos. 2960-2965, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D) on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

The species was also collected in the upper horizon on Seymour Island.

There are two recent species of this group in the Antilles and one in the Gulf of California, but none is so far reported from the Panamic or Peruvian region.

34. **Divaricella lucasana** Dall & Ochsner, new name

Plate 2, figures 17, 21, 24

Lucina eburnea REEVE, Conch. Icon., VII, *Lucina*, pl. VIII, fig. 49, 1850. Not *L. eburnea* DESHAYES, Bull. Soc. Géol. de France, VI, 1835.

Holotype: No. 2966, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

This species ranges from Cape San Lucas south to Panama Bay. It was collected in abundance from the old beach deposit of probable Pleistocene age, 1¼ miles northeast of Vilamil, Albemarle Island.

35. **Chama phonea** Dall & Ochsner, new species

Plate 3, figures 4, 6

Valve more or less spiral, the apex being concealed, heavy, thick, solid, with obscure indications of two spiral shallow depressions and sculptured by rude concentric imbricated

lamellæ, not spinose or crenulated and without radial sculpture; ligamentary border and sulcus nearly half as long as the circumference of the valve, below them and curving with them is a broad cornucopia-shaped ridge recalling the area in an oyster shell; from its abrupt posterior termination projects a narrow, short, granulose tooth with a wide, striated, shallow depression (to receive a tooth of the opposite valve) in front of it and below it; cavity of the disk extending under the hinge plate; adductor scars large, subequal, the disk between them excavated, margin of the valve not crenulated but minutely granulose; spirality dextral. Vertical measurement, 38 mm.; transverse, 45 mm.

Holotype: No. 2969, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, March 5, 1906, **1¼ miles northeast of Vilamil, Albemarle Island, Galapagos Group.** Probably Pleistocene.

The specimen is an upper valve upon which are seated a Polyzoan, the lower valve of a specimen of *Chama exogyra* Conrad, and a coral resembling *Astrangia.*

No recent species of the western coast is like the present form. A different but undeterminable species of *Chama* was collected from the upper zone of Seymour Island.

36. **Chione seymourensis** Dall & Ochsner, new species

Plate 3, figures 1, 5

Shell small, inflated, with low, slightly prosocoelous beaks over a narrow lanceolate lunule; beaks nearer the anterior end, which is evenly rounded; posterior end more oblique, base evenly arcuate; radial sculpture of low flat riblets separated by much narrower grooved interspaces; the radials are cancellated by somewhat irregular, subequidistant, incised concentric lines coincident with the lines of growth; this sculpture covers the whole disk, and there is no escutcheon; internal margins of the valve smooth; pallial and muscular impressions hidden by matrix; right valve with three diverging cardinals, the anterior feeble, the median strongest; the ligament is sunken and rather long. Height, 22 mm.; length, 34 mm.; beak behind the anterior end, 10 mm.; diameter of right valve, 6 mm.

Holotype: No. 2970, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, November 21, 1905, from upper horizon, **Seymour Island, Galapagos Group.** Probably Pliocene.

This species is nearest the recent *C. pertincta* Dall, from the Gulf of Panama.

37. **Ervilia galapagana** Dall & Ochsner, new species

Plate 4, figure 6

Shell small, plump, elongate-ovate, anterior end slightly shorter; both ends evenly rounded, base arcuate, beaks inconspicuous; sculpture of regular and regularly spaced concentric impressed lines with wider interspaces, and occasional prominent concentric incremental ridges, indicating resting stages; margins entire, hinge apparently typical, but most of the interior obscured by matrix. Height, 4.0 mm.; total length, 6.5 mm.; beaks in front of the posterior end, 4.0 mm.

Holotype: No. 2971, Mus. Calif. Acad. Sci., collected by W. H. Ochsner, and Joseph R. Slevin, November 17, 1905, from upper horizon (zone D), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

No recent species of this genus has yet been reported from the tropical Pacific coast of America. The Antillean species is marked by much sharper and closer sculpture.

38. **Pholadomya darwini** Dall & Ochsner, new species

Plate 3, figure 7; plate 4, figure 3

Shell large, thin, inflated, very slightly inequivalve, the right valve being the smaller; beaks inflated, nearly touching each other; anterior end rather abrupt and much shorter than the posterior; ligamentary furrow short; posterior end defective but from the earlier incremental lines it is apparently short, rounded, and with a nearly cylindrical wide gape; the shell in a general way resembles *P. candida* of the West Indies but is proportionately shorter, more inflated and larger; the sculpture much resembles that of *P. candida,* being com-

posed radially of (more than 13) low rounded arcuate ribs with the concavity posterior and separated by wider interspaces with rarely a smaller intercalary rib; the anterior end and a dorsal part of the valves behind the beaks has no radial sculpture; the concentric sculpture is stronger on the beaks and obsolete on the lower half of the shell, it comprises narrow rather regular ripples separated by subequal interspaces which obscurely nodulate the radials at the points where the ripples over ride the ribs; the margins are entire, the interior of the shell inaccessible. Height at the beaks, 55 mm.; diameter, 44 mm.; estimated length about, 75 mm.

Holotype: No. 2972, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from lower horizon (zone A), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This is another of the species which recalls the Antillean fauna in which *Pholadomya candida* still survives, the only living representative of its group except an aberrant species in Japan. The presence of this species in the Galapagos Pliocene emphasizes the American character of the Galapagos fauna.

The species is named for Charles Darwin, the first naturalist to visit the Galapagos Islands.

39. **Panope similaris** Dall & Ochsner, new species

Plate 5, figure 1

Shell large, white, inequilateral, the anterior end shorter beaks small, deeply incurved, slightly opisthocoelous, without lunule or escutcheon; anterior dorsal slope arching into the evenly rounded anterior margin; posterior dorsal slope descending, concavely arched to meet the obliquely truncate posterior end which gapes widely and has the lower angle produced; base slightly arcuate, ascending to meet the truncation, so that the posterior part of the shell appears distinctly attenuated; sculpture near the beaks of small concentric ripples with subequal interspaces, which become less regular and less emphatic toward the middle of the disk and obsolete be-

yond it; there also seems to have been, especially on the posterior part of the shell, a minute granulation; the interior is obstructed by hard matrix. Height, 87 mm.; length, 143 mm.; diameter, 48 mm.; beaks behind the anterior end, 55 mm.

Holotype: No. 2973, Mus. Calif. Acad. Sci., collected by W. H. Ochsner and Joseph R. Slevin, November 17, 1905, from upper horizon (zone B), on **east shore of Indefatigable Island, Galapagos Group.** Probably Pliocene.

This is a narrower shell, more attenuated and more obliquely truncate behind than *P. generosa* Gould, of California.

PLATE 2

Fig. 1. *Terebra albemarlensis* Dall & Ochsner, new species. Holotype, No. 2894 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 85 mm.; p. 99.

Fig. 2. *Terebra galapagina* Dall & Ochsner, new species. Holotype, No. 2897 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 35 mm.; p. 100.

Fig. 3. *Terebra litorea* Dall & Ochsner, new species. Holotype, No. 2904 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 56 mm.; p. 101.

Fig. 4. *Conus indefatigabilis* Dall & Ochsner, new species. Holotype, No. 2905 (C. A. S. type coll.) from zone *A*, Indefatigable Island; Pliocene; height, 57 mm.; p. 102.

Fig. 5. *Conus academicus* Dall & Ochsner, new species. Holotype, No. 2907 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 31 mm.; p. 102.

Fig. 6. *Conus loomisi* Dall & Ochsner, new species. Holotype, No. 2910 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 44 mm.; p. 103.

Fig. 7. *Cancellaria emydis* Dall & Ochsner, new species. Holotype, No. 2916 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 23 mm.; p. 105.

Fig. 8. *Latirus galapaganus* Dall & Ochsner, new species. Holotype, No. 2918 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 24 mm.; p. 107.

Fig. 9. *Alectrion tropicalis* Dall & Ochsner, new species. Holotype, No. 2925 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 43 mm.; p. 109.

Fig. 10. *Alectrion oldroydæ* Dall & Ochsner, new species. Holotype, No. 2926 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 34 mm.; p. 110.

Fig. 11. *Nerita oligopleura* Dall & Ochsner, new species. Holotype, No. 2937 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 14 mm.; p. 114.

Fig. 12. *Turbo agonistes* Dall & Ochsner, new species. Holotype, No. 2939 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height 25 to 31 mm.; p. 115.

Fig. 13. *Tegula forbesi* Dall & Ochsner, new species. Holotype, No. 2941 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 21.5 mm.; p. 116.

Fig. 14. *Phos cocosensis* Dall. (See Proc. U. S. Nat. Mus., Vol. 18, 1895, p. 11) Plesiotype, No. 2974 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 36 mm.; p. 96.

Plate 2 continued on next page

PLATE 2—*Continued from preceding page*

Fig. 15. *Turbo vermiculosus* Dall & Ochsner, new species. Holotype, No. 2938 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 34 mm.; p. 115.

Fig. 16. *Turbo agonistes* Dall & Ochsner, new species. Paratype, No. 2940 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 24 mm.; p. 115.

Fig. 17. *Divaricella lucasana* Dall & Ochsner, new name. Paratype, No. 2968 (C. A. S. type coll.) from Albemarle Island, Pleistocene; height, 20 mm.; p. 122.

Fig. 18. *Arca seymourensis* Dall & Ochsner, new species. Holotype, No. 2943 (C. A. S. type coll.) from Seymour Island, Pliocene; length, 35 mm.; p. 117.

Fig. 19. *Pecten insulus* Dall & Ochsner, new species. Holotype, No. 2946 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 17 mm.; p. 119.

Fig. 20. *Pecten insulus* Dall & Ochsner, new species. Paratype, No. 2947 (C. A. S. type coll.) from zone *D*, Indefatigable Island; height, 21 mm.; p. 119.

Fig. 21. *Divaricella lucasana* Dall & Ochsner, new name. Holotype, No. 2966 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 18.6 mm.; p. 122.

Fig. 22. *Pecten seymourensis* Dall & Ochsner, new species. Holotype, No. 2948 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 57 mm.; p. 119.

Fig. 23. *Strombus propegracilior* Dall & Ochsner, new species. Holotype, No. 2936 (C. A. S. type coll.) from zone *B*, Indefatigable Island; Pliocene; height, 80 mm.; p. 114.

Fig. 24. *Divaricella lucasana* Dall & Ochsner, new name. Paratype, No. 2968*B* (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 20 mm.; p. 122.


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PLATE 3

Fig. 1. *Chione seymourensis* Dall & Ochsner, new species. Holotype, No. 2970 (C. A. S. type coll.) from Seymour Island; Pliocene; length, 34 mm.; p. 123.

Fig. 2. *?Lima nesiotes* Dall & Ochsner, new species. Holotype, No. 2955 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 48 mm.; p. 120.

Fig. 3. *?Lima nesiotes* Dall & Ochsner, new species. Paratype, No. 2957 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 44 mm.; p. 120.

Fig. 4. *Chama phonea* Dall & Ochsner, new species. Holotype, No. 2969 (C. A. S. type coll.) from Albemarle Island, Pleistocene; vertical measurement, 38 mm.; p. 122.

Fig. 5. *Chione seymourensis* Dall & Ochsner, new species. Holotype, No. 2970 (C. A. S. type coll.); same specimen as fig. 1; p. 123.

Fig. 6. *Chama phonea* Dall & Ochsner, new species. Holotype, No. 2969 (C. A. S. type coll.); same specimen as fig. 4; p. 122.

Fig. 7. *Pholadomya darwini* Dall & Ochsner, new species. Holotype, No. 2972 (C. A. S. type coll.) from zone *A*, Indefatigable Island; Pliocene; diameter, 44 mm.; p. 124.

Fig. 8. *Lucina spherica* Dall & Ochsner, new species. Holotype, No. 2959*A* (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 50 mm.; p. 121.

Fig. 9. *Pecten* (*Pecten*) *slevini* Dall & Ochsner, new species. Holotype, No. 2944 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 70 mm.; p. 118.

Fig. 10. *Psammosolen galapaganus* Dall. Plesiotype, No. 2975 (C. A. S. type coll.) from Albemarle Island; Pleistocene; length, 55 mm.; p. 97.


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PLATE 4

Fig. 1. *Codakia recta* Dall & Ochsner, new species. Holotype, No. 2958 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 83 mm.; p. 121.

Fig. 2. *Lucina spherica* Dall & Ochsner, new species. Holotype, No. 2959*B* (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 50 mm.; p. 121.

Fig. 3. *Pholadomya darwini* Dall & Ochsner, new species. Holotype, No. 2972 (C. A. S. type coll.) from zone *A*, Indefatigable Island; Pliocene; height, 55 mm.; p. 124.

Fig. 4. *Pecten* (*Pecten*) *slevini* Dall & Ochsner, new species. Holotype, No. 2944 (C. A. S. type coll.) from zone *D*. Indefatigable Island; Pliocene; height, 70 mm.; p. 118.

Fig. 5. *Arca seymourensis* Dall & Ochsner, new species. Holotype, No. 2943 (C. A. S. type coll.) from Seymour Island; Pliocene; length, 35 mm.; p. 117.

Fig. 6. *Ervilia galapagana* Dall & Ochsner, new species. Holotype, No. 2971 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 4 mm.; p. 124.

Fig. 7. *Lucina spherica* Dall & Ochsner, new species. Holotype, No. 2959*A* (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 50 mm.; p. 121.

Fig. 8. *Psammosolen galapaganus* Dall. Plesiotype, No. 2975 (C. A. S. type coll.) from Albemarle Island; Pleistocene; length, 55 mm.; p. 97.

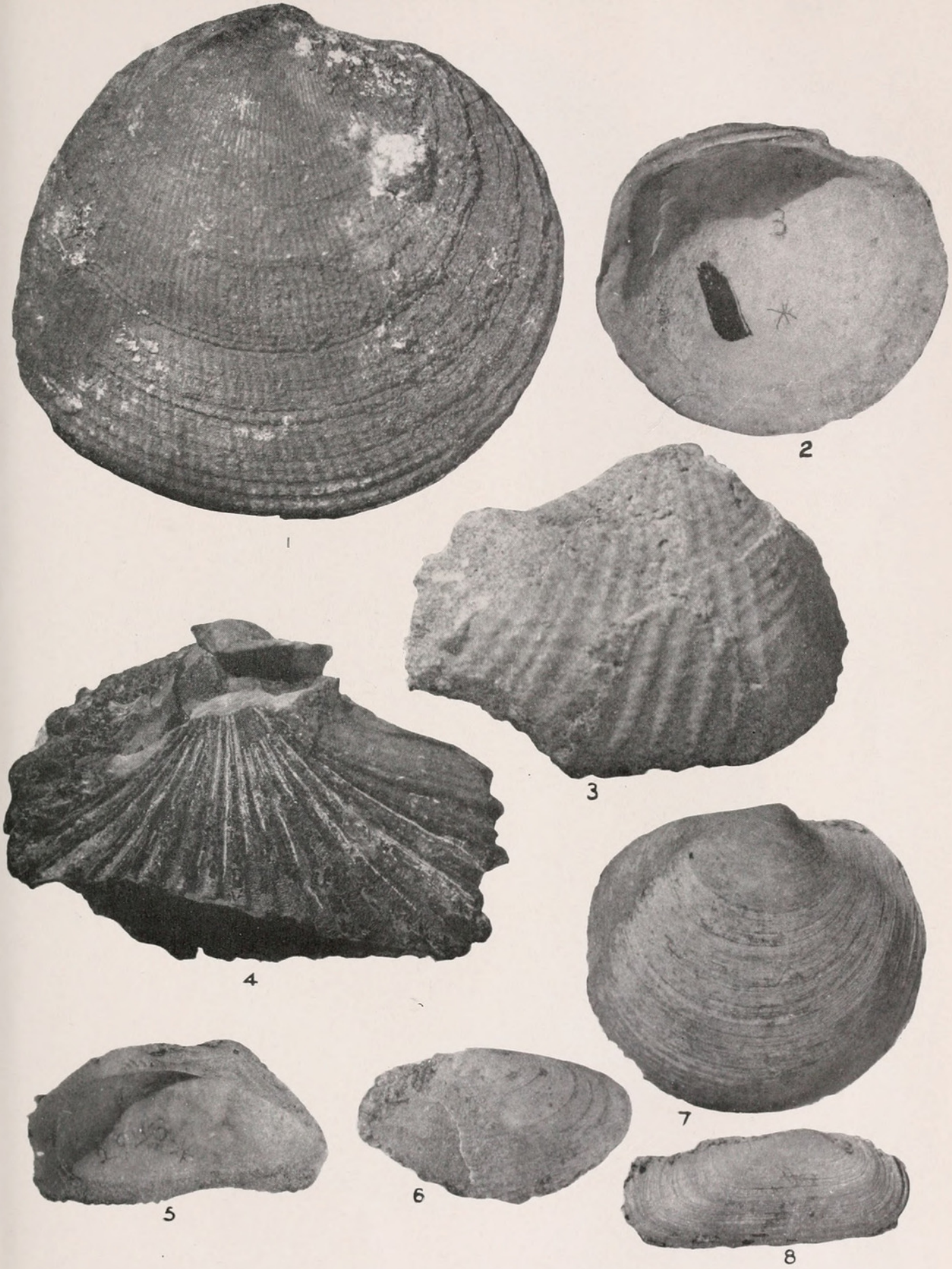
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PLATE 5

Fig. 1. *Panope similaris* Dall & Ochsner, new species. Holotype, No. 2973 (C. A. S. type coll.) from zone *B*, Indefatigable Island; Pliocene; length, 143 mm.; p. 125.

PLATE 6

Fig. 1. *Epitonium implicatum* Dall & Ochsner, new species. Holotype, No. 2932 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; length, 18 mm.; p. 111.

Fig. 2. *Epitonium ennapleura* Dall & Ochsner, new species. Holotype, No. 2933 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; length, 10.3 mm.; p. 112.

Fig. 3. *Epitonium innominatum* Dall & Ochsner, new species. Holotype, No. 2934 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; length, 9.5 mm.; p. 112.

Fig. 4. *Acirsa albemarlensis* Dall & Ochsner, new species. Holotype, No. 2927 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 10.5 mm.; p. 110.

Fig. 5. *Epitonium nesioticum* Dall & Ochsner, new species. Paratype, No. 2929 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 8 mm.; p. 111.

Fig. 6. *Epitonium nesioticum* Dall & Ochsner, new species. Holotype, No. 2928 (C. A. S. type coll.) from Albemarle Island, Pleistocene; height, 7.5 mm.; p. 111.

Fig. 7. *Strombina ? liopleura* Dall & Ochsner, new species. Holotype, No. 2922 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 7 mm.; p. 108.

Fig. 8. *Alectrion oldroydæ* Dall & Ochsner, new species. Holotype, No. 2926 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height 34 mm.; p. 110.

Fig. 9. *Latirus galapaganus* Dall & Ochsner, new species. Holotype, No. 2918 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 24 mm.; p. 107.

Fig. 10. *Latirus melvilli* Dall & Ochsner, new species. Holotype, No. 2919 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; height, 27 mm.; p. 106.

Fig. 11. *Colubraria pervaricosa* Dall & Ochsner, new species. Holotype, No. 2921 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 18 mm.; p. 107.

Fig. 12. *Surcula insulæ* Dall & Ochsner, new species. Holotype, No. 2913 (C. A. S. type coll.) from zone *D*, Indefatigable Island; Pliocene; 26 mm. p. 104.

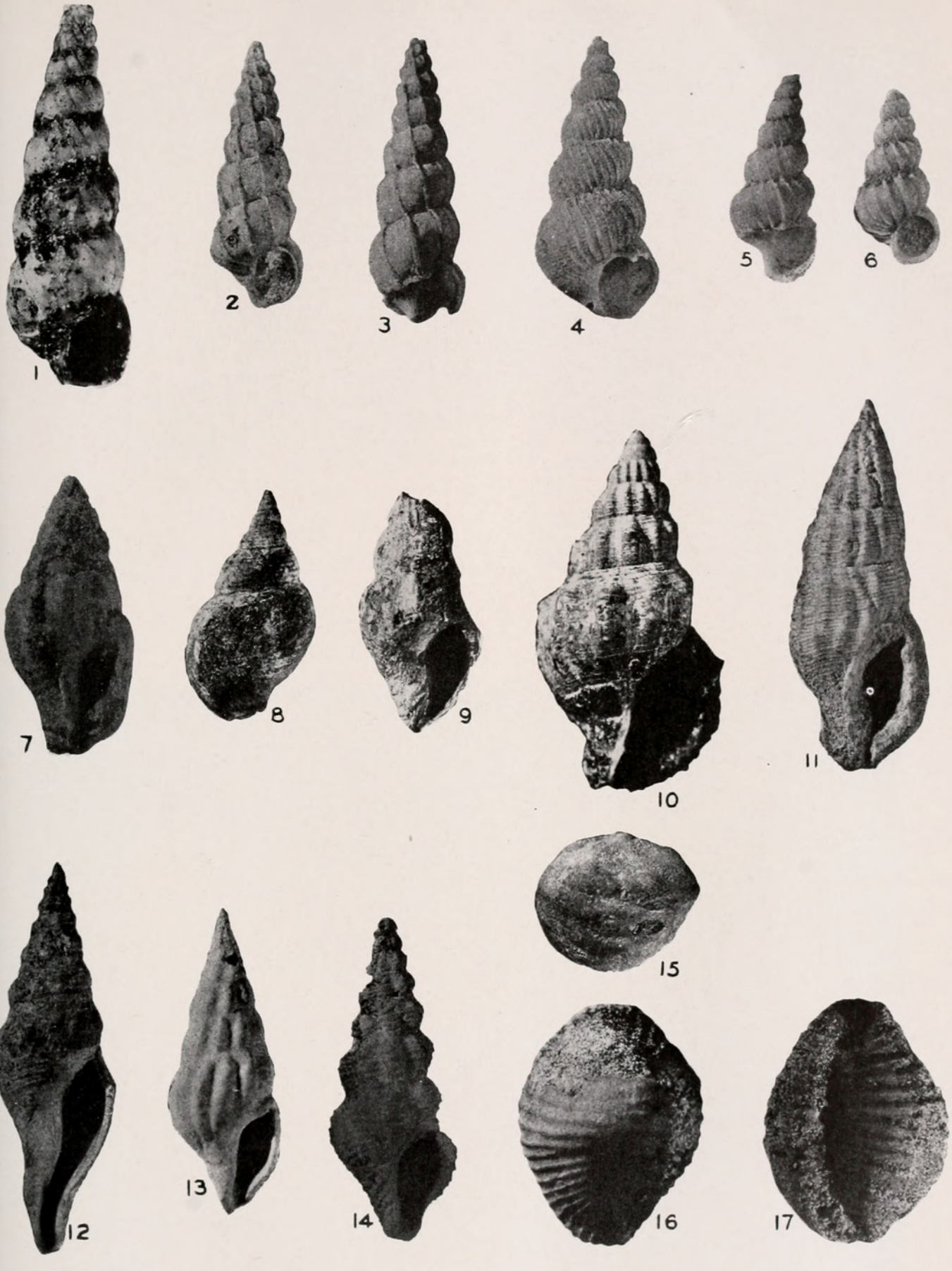
Fig. 13. *Cymatosyrinx zeteki* Dall & Ochsner, new species. Holotype, No. 2914 (C. A. S. type coll.) from Albemarle Island; Pleistocene; height, 20 mm.; p. 104.

Fig. 14. *Fusinus* species. Plesiotype, No. 2976 from Albemarle Island; Pleistocene; height, 22 mm.

Fig. 15. *Nerita oligopleura* Dall & Ochsner, new species. Holotype, No. 2937 (C. A. S. type coll.) from Seymour Island; Pliocene; height, 14 mm.; p. 114.

Fig. 16. *Trivia pulloidea* Dall & Ochsner, new species. Holotype, No. 2935 (C. A. S. type coll.) from Albemarle Island; Pleistocene; length, 8 mm.; p. 113.

Fig. 17 *Trivia pulloidea* Dall & Ochsner, new species. Holotype, No. 2935 (C. A. S. type coll.). Same specimen as Fig. 16.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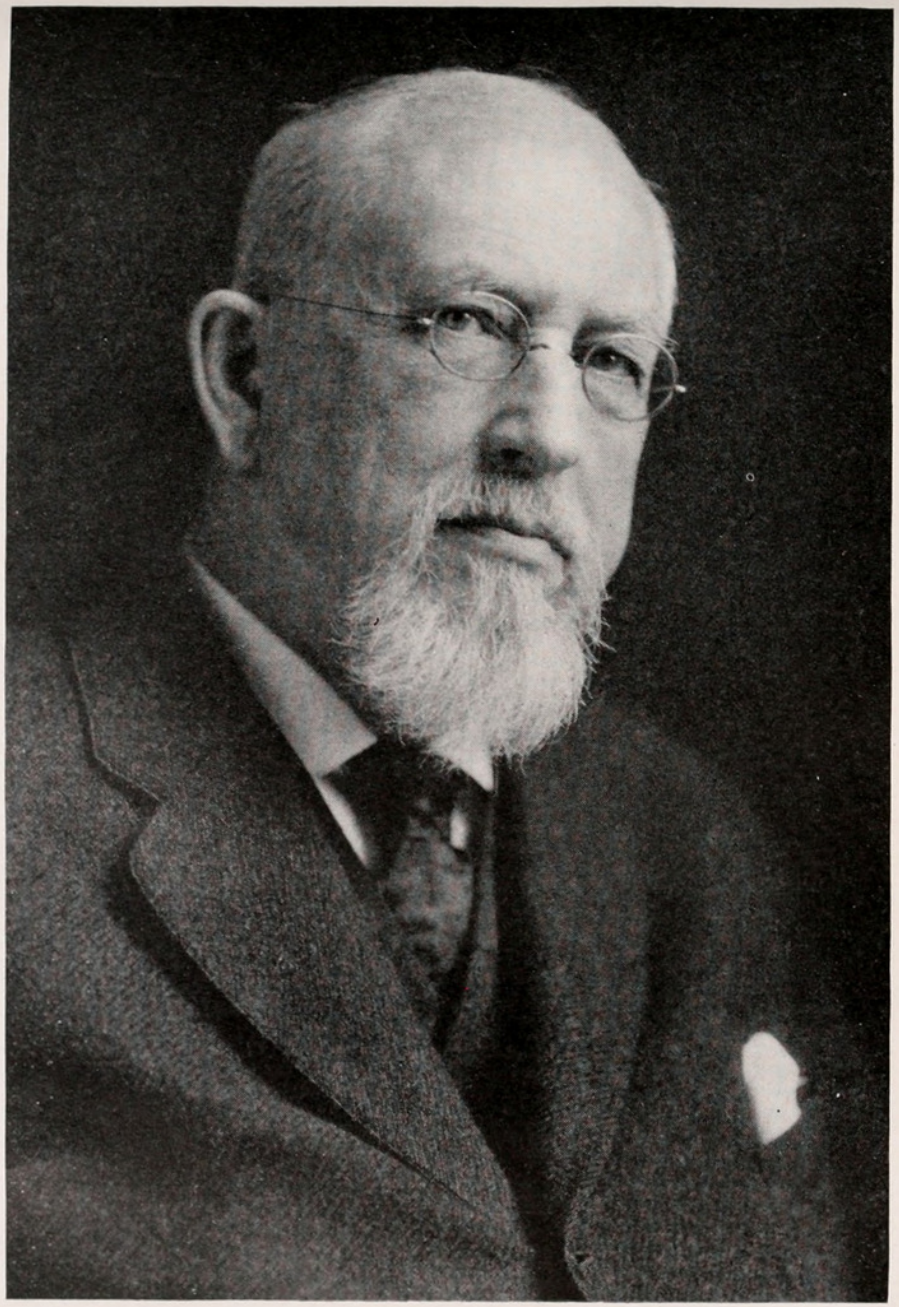
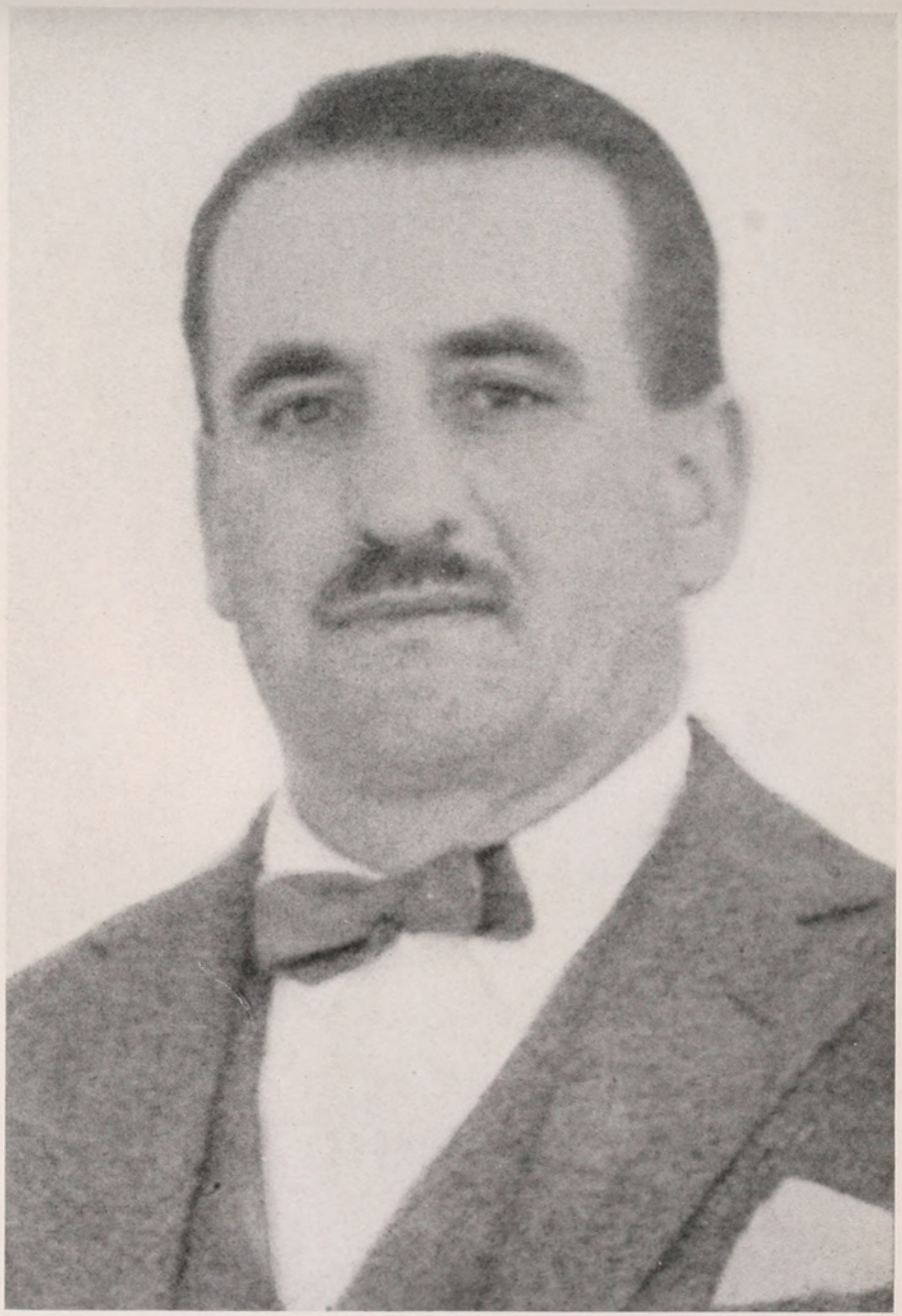


Wm. H. Dall

August 21, 1845—March 27, 1927.



Washington Henry Ochsner

July 4, 1879—April 11, 1927.