ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 19 NUMBER 2

QUANTITATIVE SURVEY OF THE BENTHOS OF SAN PEDRO BASIN, SOUTHERN CALIFORNIA

PART II

FINAL RESULTS AND CONCLUSIONS

(Maps 1-2, Plates 1-13)

BY

OLGA HARTMAN

THE UNIVERSITY OF SOUTHERN CALIFORNIA PRESS
LOS ANGELES, CALIFORNIA
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INTRODUCTION

This is a continuation and conclusion of the study of the San Pedro area for which preliminary results have been published (Hartman, 1955). This area (Map 1) lies between the mainland of southern California and Santa Catalina Island (Map 2), in 33° and 34° north Latitude, and 117° to 119° west Longitude. The submarine lands comprise more than 1060 square miles, of which the shelflands make up about a fourth, the slopes and canyons together about half, and the San Pedro Basin nearly a fourth. The terrain is rugged, consisting of shelf, slope, canyon, basin and sea mount features; depths range from a few to 495 fathoms. This large, partly enclosed, oceanic area receives not only the discharge of the Los Angeles, San Gabriel and Santa Ana Rivers which drain the slopes of the lofty San Gabriel and San Bernardino Mountains, but also the liquid effluent wastes of populous Los Angeles County. As a result, much terrigenous material is carried downstream to the sea, where long-shore currents, chiefly with a southeasterly drift, pick up the loads, to deposit the coarser gravels along the beaches and shallow shelf; the sands, silts and muds are carried successively farther out, or may be deposited in the canyons and San Pedro Basin. All but the finest particles may have been filtered out before the nutrient-rich waters reach the outer shelf and slope. As a result, the long-shore shelves and slopes are heavily populated with a richly diversified benthic fauna, which attains its maximum development along the Palos Verdes and the San Pedro shelves. These benthic populations chiefly represent a few groups, includ-

ing infaunal polychaetes, nemerteans, enteropneusts, and some others. They maintain a dynamic stability, showing no seasonal differences, and have continued to flourish through several years.

This broadly oval submarine area was marked off as a grid, at about two-mile intervals, resulting in 267 intersecting points (Hartman, 1955, pp. 6, 7). Grab samples were taken from these pre-selected sites, and analyzed for their specific components. The samples varied greatly in volumetric sizes, ranging from 0.06 to nearly 3 cubic feet. The surface areas covered by the sampler probably varied far less, because the initial bite-size was more nearly equal for all samples. The sampler was effective in taking surface scratchings, where the largest numbers of animals are known to occur. In assessing unit quantitative values, therefore, not only differences in grab sizes, but kinds of substrata are to be considered. It is further noteworthy that all final values must be considered minimal, for only those organisms which finally reached the microscope and the specialist could be fully named and recorded. In this study, therefore, it would be meaningless to re-assess these areal quantities to units of a square meter, for it has been observed repeatedly that the aggregates of animals in the San Pedro area occur in small patches, with surface units perhaps much less than a square meter. Even more importantly, it has been shown that the faunal units are patchy, differing greatly from one sample to the next.

Except for differences in contour, the physical features are fairly uniform. Salinity is nearly constant throughout the year, ranging from 33.5% near the surface (physical data are from Emery, 1960, p. 108) to 34.29% in 100 fms. There is some indication that lowered salinities occur in scattered spots, possibly near aquifers, as indicated by the presence of peak numbers of the polychaete *Capitella capitata* subspp. Such spots have been found in the San Pedro shelf as well as in other offshore places (Hartman, 1961a). Temperatures in the sediments vary little, from 12.5°C near the surface, to 8.5°C in 100 fms, and 5.06°C in 495 fms, in the San Pedro basin. Dissolved oxygen varies from 5.5 ml/l at 50 fms, 1.5 ml/l at 100 fms, to only 0.2 ml/l in the San Pedro basin, where there is almost no life. Sediments are chiefly sands, with coarser fractions near beaches and increasingly finer sands at greater distances from shore; sands change to silty sands, sandy silts and then to clays and oozes along deep slopes, in canyon and basin depths, and axes of canyons, and their lower ends may have coarse gravels (Emery and Hülsemann, 1963, p. 62). Some rocky outcrops, such as the sea mounts, are conspicuous in a few places. Red sands, near Alamitos Bay, in 3 to 7.5 fms, and near the center of San Pedro shelf, are sparse.

METHODS

This planned procedure was more or less consistently followed: (1) The samples were collected, usually with the orange-peel grab, less often with the larger Campbell grab, and processed aboard ship, using a screen with finest mesh slightly less than a millimeter. (2) The washed samples were fixed in formalin-seawater, and then transferred to the laboratory, where more complete sorting and washing were done. Larger macroscopic animals were removed, some of the larger ones weighed, and assessments made of the largest individuals in the sample, the most conspicuous species, and the general characteristics of the faunal population. (3) As many as possible of the invertebrate animals were identified to the specific level, and counts made of individual species. Smaller animals, including nematodes, small crustaceans (amphipods, isopods, cumaceans, tanaids, ostracods, and others) as well as juvenile stages of other animals, were probably taken only very incompletely because of the coarse techniques employed. It is therefore all the more noteworthy that large numbers of these and other animals were retained in the individual samples.

(4) Many species from southern California were newly described, based on specimens found in the materials. Separate reports have been issued for some major groups. Amphipods have been studied by Dr. J. Laurens Barnard (1957-1963) and Barnard and Given (1960), cumaceans by Mr. Robert Given (1961, 1964) and Barnard and Given (1961) and some isopods by Dr. Robert Menzies (1959). Echinoderms were identified by Mr. Fred Ziesenhenne (1951) and Barnard and Ziesenhenne (1961) and polychaetes by Hartman (1955-1963). Mollusks were studied by Mr. Gilbert F. Jones (1963, 1965), the late Dr. Norman Mattox (1955, 1958) and Dr. Mathilde Schwabl (1961, 1963). There still remain many groups of animals requiring study, the most important of which are nemerteans, sipunculids, enteropneusts, ostracods, tanaids, ceriantharian and other coelenterates, and nematodes.

(5) The distributions of individual species, with their relative abundance, were named for each of the selected areas, and plotted by increasing depth (see charts following the analyses for each area). These show not only the recurrence of each species in single areas but throughout the region, and associated ecological groupings, in a frame of reference.

SUMMARY OF RESULTS

A sampler lowered almost anywhere off the coast of southern California recovers an amazing array of kinds of animals. These kinds and numbers vary from one sample to the next and attain large numbers in shallow bottoms. This diversity extends not only to most samples and in all kinds of sediments, but throughout the year, with little indication of season. It is difficult to relocate the exact spot from which a sample was taken, except in shallowest bottoms or in few places where one or few species are known to occur in massed numbers. Such are some known *Dendraster* and *Capitella* bottoms, where exceptional aggregates occur. Usually the numbers of species in a sample from shallow bottoms range to a hundred or more, with individuals numbering to near five thousand. These species occur as aggregates, where the presence of one generally indicates that of other kinds; they seem to maintain their restricted locations over periods of years, as proven by subsequent probes in successive seasons and years.

The kinds of species and their respective numbers, the stages of development, and the state of maturity, as well as the associations with other groups in the sample, are repetitive characteristics and should therefore be predictable.

Samples with large numbers of specimens are generally characterized by having one or a few species with exceptionally high numbers of individuals; these specific units may change from one sample to the next, and their occurrences are not as predictable as are the aggregated species with which they occur. Their kinds and distributions are indicated by an asterisk in the charts, below. Exception must be made for the *Amphiodia urtica-Pectinaria californiensis* association, in which individual numbers continue high along most of the edge of the San Pedro shelf and in other areas remote from shore, especially where sediments are somewhat impoverished. Isolated peak numbers are indicated for many of the more than 600 species named below. Peak numbers may be partly explained by the successful establishment of spatfalls of larvae, but they do not explain the continuance of the colony through successive generations.

Specific diversity in southern California is so characteristic that large-scale communities of organisms cannot be identified. Exception may be made for a *Listriolobus pelodes* colony on the Santa Barbara shelf (Barnard and Hartman, 1959) where a continuous shelf depth is occupied by an identifiable community of organisms.

Numbers of species and specimens are highest in shelf depths, and lowest in outer slopes and the oxygen-impoverished, long-shore basin

(Hartman and Barnard, 1958, p. 29). Numbers of species and specimens have ranged to 88 species and about 4500 specimens per sample.

Biomasses are highest in long-shore areas, especially the Palos Verdes and San Pedro shelves, where the sediments are enriched by the runoff of the mainland. Single samples have yielded a gross moist weight of 768 grams per sample, and similar high biomasses have been found on the San Pedro shelf and other places along the shelflands of southern California (see California, 1965a, 1965b, pp. 104-319).

Most of the species named below may be expected to produce individuals with a short life span, not exceeding a year. Cursory examinations have shown that ova are usually numerous in mature individuals, insuring the wide dispersal of larval stages, well beyond the limits in which the species normally settles and matures. Nearly all can be expected to occur in competition with others, where space, food, protection from predators are factors determining survival and further reproduction. The fact remains that most of the benthic stages of these species continue to exist only in selected places. It must be assumed that these areas are previously biologically conditioned by the predecessors of the same species.

This horizontal distributional pattern is closely linked to that of vertical zonation, for it can be seen (see charts) that replacement of closely related species, by depth, is a constant factor of these benthic animals. The result is a stepping-stone effect, where greater depths result in a dropping out of many species, and additions of others. This effect is illustrated not only for the polychaetes, but for echinoderms and mollusks, and may extend to other well represented groups. It has also been demonstrated for the faunas in the submarine canyons of southern California (Hartman, 1963a).

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Many scientists from the Allan Hancock Foundation of the University of Southern California participated in various aspects of this study. The collections of samples were taken aboard the Research Vessel VELERO IV, and processed aboard ship by members of the Hancock staff. The tedious tasks of sorting and identifying the thousands of specimens were performed by numerous specialists and assistants; to them much gratitude is due for their patience and care. These assistants were supported by the Allan Hancock Foundation, the California State Water Pollution Control Board, and the National Science Foundation; the administrations of these organizations are gratefully recognized for their cooperation. The identifications of invertebrate specimens were undertaken by various specialists (see Bibliography at end). The echinoderms

were identified by Mr. Fred Ziesenhenne; the mollusks were studied by Mr. Gilbert F. Jones and the late Dr. Norman Mattox. Crustaceans were identified or described by various specialists; Dr. J. Laurens Barnard studied the amphipods, Mr. Robert Given the cumaceans, Dr. Robert Menzies some of the isopods, and Mr. William Banta the bryozoans from the Farnsworth Bank. Professor K. O. Emery provided copies of photographs from submarine areas off Santa Catalina Island. The National Science Foundation, through grant no. B5-1780, supported Mrs. Hannelore Paxton, who assisted in the organization and preparation of the manuscript, and Mr. Carl Petterson, illustrator, who prepared the illustrations for plates 1 to 6, and arranged the photographs for plates 8 to 14. Mr. Anker Peterson prepared the figures on plate 7. Mrs. Dorothy Halmos, Editor of the Hancock Publications, gave invaluable aid in the final preparation of the manuscript. To all of these people and institutions, I am most deeply indebted.

DESCRIPTIONS OF NEW AND LITTLE KNOWN POLYCHAETOUS ANNELIDS FROM THE SAN PEDRO REGION

The benthic samples taken from the San Pedro region were unusually productive of polychaetous annelids, and resulted in the recovery of species heretofore unknown. Some are here described.

Family POLYNOIDAE

Genus **Gattyana** McIntosh, 1900

Gattyana brunnea, new species

(Plate 1, Figs. 1-3)

Collection: Sta. 2154 (TYPE).

A small, linear, depressed species, it measures 15 mm long by 2 mm wide with parapodia, and has 30 segments. Elytra number 15 pairs and completely cover the dorsum. The prostomium has two pairs of eyes; the anterior ones are in front of midlength and at sides, and the posterior pair nearer together, and at the posterior margin of the prostomium. Elytra are subcircular (Fig. 1) in anteriormost segments, where they are large, dusky brown and have a chalky white spot over the elytral scar; their lateral margins are smooth in the first pairs, then have a sparse marginal fringe at outer lateral edges, with the fringe in a single row; they are never fimbriated as in other species of the genus. The upper surface of elytra appears smooth but is sparsely covered with low, inconspicuous surface nodules.

Notosetae occur in small, close fascicles and do not extend to the distal ends of neuropodial lobes. Notosetae are hairlike; under high magnification they show deep lateral serrations (Fig. 2). Neurosetae (Fig. 3) are much coarser; each is distally entire, the tip long, smooth, slightly falcate, and with four to seven rows of serrations subproximally.

Gattyana brunnea approaches *G. ciliata* Moore (1902, p. 263) from which it differs in lacking heavy elytral fringe, and in the details of parapodial setae.

Gattyana brunnea was taken only at Sixmile bank, in 300 fms, in rocky bottom.

Genus **Halosydna** Kinberg, 1855

Halosydna latior Chamberlin, 1919

Halosydna latior Chamberlin, 1919:1-2; Rioja, 1941:680.

Collections: Many specimens come from shallow depths off southern California, usually in a large gastropod shell occupied by a pagurid crab, especially in shells of *Polinices* and *Strombus* occupied by *Holopagurus pilosus* Holmes. The commensal polynoid is usually paired, with the individuals near the anterior end of the crab. The body is greatly depressed, unusually broad for a *Halosydna*; its length is 40 to 50 mm, its width 14 to 20 mm, and segments number 37. The 18 pairs of elytra are broadly imbricated and completely cover the body. The prostomium has two pairs of moderately large eyes, the anterior pair just in front of mid-length, the posterior pair nearer together and near the posterior margin. Parapodia are distinctly biramous with smaller notopodia and larger neuropodia. Neurosetae are thick, distally falcate, the tip entire. Elytra are characteristic; they have broad, smooth surfaces and enlarged, very flat, pale pustules in an area behind the elytral scar.

Halosydna latior is recorded from southern California and western Mexico, in shelf depths; its association with pagurid crabs is not previously mentioned.

Genus **Harmothoe** Kinberg, 1855

Harmothoe priops Hartman, 1961

(Plate 1, Figs. 4-6)

Harmothoe priops Hartman, 1961b:50-51; Hartman, 1963b:3.

Collections: Sta. 2314; Sta. 4886.

The body is about 7 mm long, 0.7 mm wide, and segments number 39. The dorsum is crossed by broad, reddish brown pigment bars which

are most intense between dorsal parapodial bases. The prostomium (Fig. 4) has distinct peaks and a deep median groove at the insertion of the median antenna. The anterior prostomial eyes are under the frontal peaks, and the posterior ones on the posterior third of the lobe; in addition, 10 to 20 irregularly dispersed small black spots are on the posterior third of the lobe. Notosetae (Fig. 5) are of one kind; each is long, slender, distally whiplike, and serrated along the cutting edge. Neurosetae are of two kinds; supra-acicular ones are similar to the notosetae; subacicular setae are thicker and distally bifid (Fig. 6).

Harmothoe priops is known from southern California, in shelf, slope and canyon depths, in silty mud bottoms.

Family HESIONIDAE

Genus **Hesionura** Hartmann-Schroeder, 1958

Hesionura coineaui difficilis (Banse, 1963)

Eteonides coineaui difficilis Banse, 1963:197-200, fig. 1; Hartmann-Schroeder, 1963:223-225, figs. 33-35.

Collection: Sta. 3595 (15+).

The body is small, slender, measures 3.5 to 5.6 mm long; its color is translucent yellow, with a dark brown pharyngeal region. The everted proboscis is dark brown, completely covered with coarse papillae in dispersed arrangement. The long trapezoidal prostomium has two pairs of long, cirriform antennae inserted at the frontal margin, and two or three small black eyespots near its posterior end. The first segment is a simple ring with a pair of long, tentacular cirri; the second segment has a pair of similar long, dorsal cirri and a pair of normal ventral cirri; the third segment is the first setigerous and has embedded acicula. The formula may be expressed thus: $1 + \frac{1}{N} + \mathrm{Sa} \frac{0}{N}$. Parapodia are uniramous, with smaller dorsal and larger ventral cirri. Setae are in small, fan-shaped fascicles, number about five or six in a bundle; all are composite, the appendage bladelike and ridged along its length.

Previously known only from San Juan Archipelago, Washington, in 20 and 100 m, from coarse, clean sand with broken shells, it is here reported from Farnsworth Bank, outer side of Santa Catalina Island, in 16 fms.

Family SYLLIDAE

Genus **Eusyllis** Malmgren, 1867

Eusyllis transecta, new species

(Plate 2)

Collection: Sta. 2006 (12, TYPE).

The body is short, thick and fragile; it measures 6.1 mm long by 0.8 mm wide between segments 10-20, or at its widest part; it has 46 segments. The dorsum (preserved) is crossed by black bars, at segmental grooves. The prostomium (Fig. 1) is subquadrate, wider than long, has four small eyes in trapezoidal arrangement, behind the insertion of the paired antennae; the anterior, slightly larger pair are wider apart than the posterior pair. The median antenna is much the longest, inserted behind the paired antennae; its length is about 2.5 times that of the paired ones, which are about as long as the second dorsal cirri. Antennae, dorsal and tentacular cirri appear smooth, but show weak annulations under magnification.

Palpi are short, broad; the two are fused at the base; each is directed forward for a length equal to that of the prostomium. The retracted proboscis and proventriculus extend through segments 1 to 5 and 6 to 11 respectively. The dissected pharynx is cylindrical; it terminates anteriorly in a serrated margin (Fig. 2); its dorsal arc is slightly crenulated and the ventral arc has 18 pointed teeth which increase in length midventrally. A large, middorsal tooth (Fig. 3) is embedded in the pharyngeal tissue some distance beyond the anterior edge (Fig. 3, seen in lateral view).

The first segment, or peristomium, slightly overlaps the prostomium medially; its tentacular cirri are long, with the dorsal pair the longest, exceeded only in length by the median prostomial antenna. The second segment is the first parapodial one; its ventral cirri are cirriform, and farther back they are short, triangular. All parapodia (Fig. 4) are lateral, have long, pseudoarticulate dorsal cirri which diminish in length posteriorly, or alternate long and short in anterior segments. Ventral cirri, from the second, are short, triangular, exceeded in length by the acicular lobes. Anterior and median parapodia have setae of two kinds; the superiormost, supra-acicular one is long, slender, distally pointed and laterally slightly dentate (Fig. 5). Subacicular setae number 9 to 12 in a fascicle; each is composite, distally falcate; anterior ones (Fig. 6) have a slightly longer appendage than posterior ones, and are dentate along the cutting edge; posterior setae have a shaft distally dentate and the appendage is smooth (Fig. 7). Acicula occur singly in a ramus; each is straight and

distally slightly club-shaped (Fig. 8). Posterior segments have simple, slender, superiormost setae, occurring singly in a fascicle; each has widely spaced denticles along the cutting edge. The body tapers posteriorly and terminates in a pair of long, cirriform, pygidial appendages.

Eusyllis transecta differs from other species of the genus in its pharyngeal formula; it has falcigerous setae which are distally entire. It has been recovered only from the San Pedro shelf, in 14 fms, where the trawl took algae, sand, rock and ascidians.

Genus **Sphaerosyllis** Claparède, 1863

Sphaerosyllis californiensis, new species

(Plate 3)

Collections: Sta. 5028 (66, TYPE); Sta. 4806 (57); Sta. 5102 (100+).

The body is small, depressed, linear and trim in appearance. Length is about 3.0 mm, width 0.5 mm, and segments number 32 to 34. The dorsal surface is papillated and convex; the ventral surface is nearly smooth and flat. The quadrate prostomium (Fig. 1) is wider than long, has a pair of broad palpi completely fused, and a slight, midfrontal emargination. The two pairs of eyes are in quadrate arrangement, with the two on a side nearly touching; the anterior pair are slightly the larger. Prostomial antennae resemble one another; all are short, clavate, their length less than that of the prostomium; the median one is inserted behind the middle of the lobe, and the paired ones are in front, within the anterior eyes.

The proventriculus, seen through the body wall (Fig. 1), is short, extends through setigerous segments 3 to 5, and is crossed by about 13 or 14 muscular bands. The anterior end of the pharynx terminates in 10 soft, widely spaced, small papillae; a conspicuous, blunt yellow, middorsal tooth is embedded in the pharyngeal wall.

The first segment is reduced to a lower lip or peristomium and a pair of bases for the tentacular cirri, best seen in ventral view; they project laterally, and in dorsal view are seen in line with the prostomial eyes. These cirri, and all other dorsal cirri are clavate, with a thick, bulbous base and a terminal digitate lobe exceeding in length that of the base. The second parapodia lack dorsal cirri, but all others have well developed ones.

Parapodia (Fig. 3) are similar throughout, but diminish in size posteriorly. Dorsal and ventral cirri are clavate, and taper distally. A superiormost, nearly straight acicular spinelike seta is present from the first, and

continues in posterior segments. This is followed inferiorly by three or four composite falcigers in which the appendage is longest (Fig. 4) in anteriormost segments, and diminishes in proportionate length farther back (Fig. 5); the distal end is falcate; the cutting edge has a few long, slender teeth in a single row. Each of the last few segments has, in addition, an inferiormost simple, slightly curved, spinelike seta (Fig. 6) directed ventrolaterally. Acicula occur singly in a ramus; each is a slender rod, distally club-shaped (Fig. 7).

The posterior end of the body terminates in a pair of short, laterally directed, clavate processes (Fig. 2) resembling the dorsal cirri.

Sphaerosyllis californiensis is characterized as follows: the epithelium is papillated; the first segment is reduced to a lower lip and a pair of tentacular bases, lying in line with the prostomial eyes; parapodia have simple setae in superiormost and inferiormost positions, and composite falcigers; acicula occur singly. It is unique for having the paired prostomial antennae inserted far forward, and the median one near the posterior end of the lobe. Composite falcigers have a few long teeth limited to the basal half of the appendage.

Sphaerosyllis californiensis occurs in San Pedro shelf, in silt and mixed sediments.

Family QUESTIDAE, new family

Genus **Questa**, new genus

Genotype: **Questa caudicirra**, new species

The body is long, linear and consists of many segments. The prostomium is a simple, triangular lobe without appendages. The first segment or peristomium is a smooth ring which is somewhat biannulated; all other segments have lateral, biramous parapodia in which notopodia and neuropodia are ventrolateral in median and posterior segments. Setae are simple, of two kinds, including slender, distally tapering ones and shorter, thicker, distally bifid hooks without a hood. The pygidium terminates in an anal pore bounded by paired cirri. The alimentary tract is simple, linear, with a pharyngeal region in the first four or five segments without jaws or other hard parts. A single species is known.

Questa caudicirra, new species

(Plate 4)

Collections: Sta. 3595 (20+, TYPE); Sta. 2298 (1).

The body is long, linear, measures 9 to 10 mm long by 0.275 mm wide and consists of 50 to 58 segments. All segments are smooth, plain,

with inconspicuous biramous parapodia (Fig. 1) from which the setae project in sparse fascicles; the last 9 to 15 segments have long, dorsally inserted branchiae. The posterior anal pore is surrounded by a pair of dorsolaterally and similar, slightly longer ventrolaterally inserted cirriform processes (Fig. 2). The prostomium (Fig. 3) is a simple, depressed, bluntly triangular lobe without eyes. The first ring is smooth, or somewhat biannulate; all other segments are simple, uniannulate, with biramous parapodia. The first three segments have only slender, distally pointed setae in notopodia and neuropodia. The fourth segment has similar setae accompanied by thicker, distally falcate hooks with bifid tip; these hooks usually number one in a fascicle (Fig. 4), but an occasional one has two or three hooks, all of one kind. Numbers of setae and hooks in fascicles remain about the same except in posteriormost, branchial segments where setae are less conspicuous.

Each long seta (Fig. 5) is serrated along the cutting edge and its tip is pointed. The hook consists of a straight, embedded shaft, a slightly curved free region, and a broader, laterally directed fang, nearly at right angles to the shaft (Fig. 6); the accessory tooth is small and distal. The alimentary tract of some specimens contains white calcareous ooze, such as the sediments in the sample from which they were removed.

These small, linear worms may be allied to the PARAONIDAE, with which they agree in their small size, the presence of two kinds of setae, and the presence of a well developed, simple prostomium. They were at first thought to have affinities with oligochaetes, but this appears unlikely in view of the characteristics named.

Questa caudicirra was taken only on Farnsworth bank, Santa Catalina Island in 16 fms, and on Lasuen sea mount, in 68 fms.

Family CIRRATULIDAE

Genus **Cirratulus** Lamarck, 1801

Cirratulus, unknown species

Collection: Sta. 2737 (2).

These individuals differ from known species of the genus, and may represent an undescribed species. Length of the body is more than 30 mm, width 3 to 4.5 mm, and segments number more than 67 (the tail is lacking). The body is inflated through setigers 10 to 25, then depressed cylindrical. Segments are uniannulate, wider than long, smooth, their width up to 25 times that of their length in front, but only 1.5 times as wide as long in middle and posterior segments. Setae are long, silky,

laterally directed, their extended length 3.5 to 5 times as long as the body is wide. The prostomium is broad, thick, nearly semicircular; eyes have not been identified. The buccal region is triannulate, with each ring smooth, and longer than the prostomium or any body segment.

The first pair of branchiae are on the posterior margin of the third buccal segment. Branchiae are inserted immediately above the notopodial ridge, in median and posterior segments. Most branchiae have been lost from the specimen, so that it looks rather like a spindle-shaped oligochaete. All setae in anteriormost segments are slender and capillary. Thick, short, acicular spines are first present in neuropodia 32, or behind the anterior, inflated region; they number only one or two in a fascicle, and are located at the lower end of the fascicle; they are accompanied by slenderer, longer capillary setae. Similar but slenderer acicular spines also occur with long, slender, capillary setae. These spines are translucent yellow, nearly straight, taper to blunt points, and never number more than two or three in a fascicle, where they are accompanied by capillary setae.

This *Cirratulus* sp. has been taken only from West End, Santa Catalina Island, in 256 fms.

Family SCALIBREGMIDAE

Genus **Sclerocheilus** Grube, 1863

Sclerocheilus acirratus, new species

(Plate 5, Figs. 1-5)

Collections: Sta. 1370 (4, TYPE); Sta. 1378 (2), White Cove, in *Eisenia* holdfasts (2).

Small individuals, yellow-orange in life, fading to colorless in alcohol, measure about 8.6 mm long by 1.4 mm wide near the middle of the body; they consist of 31 to 50 segments. The surface epithelium is rugose, with transverse annulations, or papillate, coarsest on the dorsum and less so ventrally. Median and posterior segments are quadri-annulated, with the rings equally long and most distinct in middle segments. Branchiae are absent. The prostomium is broadly T-shaped, with the lateral extensions continuous with the prostomium (Fig. 1). Two pairs of transverse reddish eye patches are conspicuous on its posterior half, with the two patches on a side near together, and the anterior ones the larger. The first segment is a short, smooth ring. The second, or first setigerous, segment is about twice as long as the first one; it has biramous parapodia with notopodia dorsolateral, and neuropodia lateral.

Notosetae of the first setiger are of two kinds; an anterior transverse row of five or six, coarse, spinelike setae (Fig. 2) is located in front of a posterior row of eight or nine slenderer, capillary ones (Fig. 3). The corresponding neurosetae are slender, capillary only, as in all successive parapodia. Median and posterior parapodia have, in addition, shorter, furcate setae in which the tines are spreading (Fig. 4) and the inner margins are serrated (Fig. 5).

Parapodia are short and truncate throughout; the setae emerge in front of short, postsetal lobes. Cirri are altogether absent, hence the specific name. The pygidium is a smooth ring without cirri.

Sclerocheilus acirratus differs from other species of the genus in lacking cirri. It may approach *S. minutus* Grube, from the Mediterranean Sea (Fauvel, 1927, p. 125), in having a single anterior segment with acicular setae. It differs from *S. minutus* in that these acicular spines are distally prolonged to slender tips, and the prostomium has four, instead of two eyes. The frontal extensions of the prostomium are continuous with the lobe, not set off by constrictions.

S. acirratus has been taken only in White Cove, Santa Catalina Island, in shallow depths, from holdfasts of *Eisenia arborea* (kelp). The species was first identified from samples taken by the VELERO III (See Fraser, 1943, for Station data), in holdfasts of this kelp. The same locality was investigated by Mr. Robert Given, where the same species was again located. It has been found nowhere else.

Genus **Asclerocheilus** Ashworth, 1901

Asclerocheilus californicus Hartman, 1963

(Plate 5, Figs. 6-9)

Asclerocheilus californicus Hartman, 1963b:56-57.

The body is long, arenicoliform, measures 43 mm long by 6 mm wide, and consists of more than 70 segments. The prostomium is triangular, broadest behind, and has a pair of thick, short, frontal processes resembling a pair of short antennae (Fig. 6); eyes are absent. The posterior end terminates in a pygidium surrounded by five short, tapering cirri; one is midventral and the others are lateral; the anal aperture is centered. Dorsal and ventral cirri are absent. Posterior parapodia are characterized by the great prolongation of superior and inferior lobes (Fig. 7) resembling dorsal and ventral cirri; they are first present from neuropodium six and notopodium seven, and continue long farther back. The first two setigerous segments have thick, acicular curved spines (Fig. 8)

in an anterior series, accompanied by longer, slenderer ones in a posterior row. Farther back, notopodia have only slender setae, and from about segment 20 they are accompanied by fewer, shorter furcate spines (Fig. 9). Neurosetae are similar to notosetae but shorter.

Asclerocheilus californicus is characterized by its greatly prolonged parapodial lobes in posterior parapodia. It is known from slope and canyon depths of southern California, in mud.

Asclerocheilus, unknown sp.

Collection: Sta. 3616 (2).

The larger specimen, in two pieces, measures 14 mm long by 1.6 mm wide in the thoracic or widest region. Segments number at least 62. The body is broadest and conspicuously rugose in the anterior third, and it tapers posteriorly, where the epithelium is less roughened. The prostomium is T-shaped, widest in front and laterally prolonged as a pair of horns which are continuous with the prostomium; a pair of conspicuous ocular patches occupies much of its first half, nearly meeting medially. The prostomium is posteriorly slightly overhung by the first short segment, a plain, incomplete ring surrounding the lobe only middorsally and laterally; the second segment is the first complete ring and its ventral part forms the lower lip.

The first two setigerous segments have thick, curved acicular spines, in an anterior series, accompanied by a posterior series of capillary setae, present in both notopodia and neuropodia. From the third segment the setae are smooth, long, capillary, and accompanied by conspicuous series of furcate setae, in both notopodia and neuropodia. Each furca has unequally long tines, with long, slender spinelike teeth along the inner cutting edges. Dorsal and ventral cirri, as well as branchiae, are totally lacking. Parapodia are clearly biramous, with notopodia and neuropodia represented by low, broad lobes, from which the setae project; the superior bases of setal fascicles are bounded by pale, glandular ridges. The pygidium terminates in 2 longer and 2 shorter, cirriform processes, directed laterally.

These specimens differ from known species of the genus in having ocular areas on the prostomium (see Uschakov, 1965:292).

The species has been taken only off East End, Santa Catalina Island, in 88 fms, in glauconitic sand.

Family SABELLIDAE

Genus **Euchone** Malmgren, 1866

Euchone arenae, new species

(Plate 6, Figs. 1-6)

Collections: Sta. 2788 (23, TYPE) ; Sta. 2417 (2).

The body is short, thick, tumid and tapers posteriorly. It measures 3.8 mm long without, and 6.2 mm long with, the tentacular crown; width is 0.7 mm. Segments include 8 thoracic and 13 to 15 abdominal setigers; each is biannulate. A narrow, glistening white band, behind the second setigerous fascicle, surrounds the body. The tentacular crown is well developed; it consists of five to seven pairs of radioles, and two pairs of long slender filaments at the ventral ends of the radiolar base (of which only one is shown in Fig. 1). Peristomial eyes are not visible, but may be faded. A palmate membrane comprises less than a fourth of the radiolar length; it is inconspicuous. A pair of reddish eyes is visible in the pygidium, in some individuals.

The thoracic collar is continuous all around and of uniform length; it is deeply cleft middorsally, where it joins the thoracic segment; a slight midventral cleft is distinguishable.

The collar segment resembles those farther back but lacks neurosetae. Its notosetae are slender, limbate and number four or five in a fascicle. More posterior thoracic notopodia have setae of two kinds; three or four in superior position are long, limbate (Fig. 2), and four to six are short, subspatulate (Fig. 3). The corresponding neuropodia have long-handled uncini, in which the distal end is a large fang (Fig. 4) surmounted by three smaller teeth in a row.

Abdominal parapodia have thick, short uncini in notopodia; they number six to eight in a row; each has a thick, broad base, a large curved fang surmounted by three or four rows of small denticles, in transverse rows (Fig. 5). The corresponding neuropodia have capillary setae, numbering three to five in a fascicle.

The posterior end terminates in an anal groove (Fig. 6) in which the last six setigerous segments are involved; this may be broadly open, as shown in the figure, or somewhat curled inward. The groove is followed by a small triangular pygidium with dorsal anal pore.

Euchone arenae differs from known species of the genus in having six setigerous segments in the anal groove. Thoracic notosetae are essentially of one kind, with the superior longer and less curved but otherwise similar to the inferior shorter ones.

Euchone arenae has been taken near Redondo Beach, in 9.5 fms, off Point Fermin, in 34 fms, and off Point Loma light, in 23 fms, in sediments of reddish brown sand.

Euchone incolor Hartman, 1965

Euchone incolor Hartman, 1965:231-232, pl. 51.

Collections: Sta. 2298 (15); Sta. 3585 (3).

Total length, excluding the tentacular crown, is 2.1 to 2.2 mm; width is 0.3 mm; segments include 8 thoracic and 8 abdominal setigers. The body is slender and linear. The flaring tentacular crown consists of four pairs of radioles, each with paired rows of pinnules; they extend distally for a length nearly one-fourth that of the body. A pair of slender cirriform radioles is present at the ventralmost end of the crown. The thoracic collar is large, voluminous and covers most of the peristomium; it has a straight, continuous margin, and is incised middorsally. Eyes have not been distinguished. The anal groove extends through the last three segments. Collar setae are slender, limbate and number about five in a fascicle. Other thoracic notosetae are slender and limbate; neurosetae are long-handled uncini with a large fang, surmounted by three smaller teeth.

Previously known from the western Atlantic Ocean, in shelf to abyssal depths (Hartman, 1965, p. 232), this is here recorded from the Lasuen sea mount, in 68 fms, and off Farnsworth bank, in 23 fms.

Euchone limicola Reish, 1959, redescribed

(Plate 6, Figs. 7-10)

Euchone limicola Reish, 1959:717-719, figs. 1-5.

Collection: Type collection from Alamitos Bay marina, and Long Beach outer harbor.

Length of the body is 8 mm of which the crown measures 2 mm; segments include 8 thoracic and 18 abdominal, of which the last 10 setigers are involved in the anal groove (Fig. 10). The tentacular crown consists of seven pairs of radioles, each with many filaments in pairs; the palmate membrane is very low and nearly lacking. Ventral scutes or glandular areas continue through seven thoracic setigers; the last one is least developed, and all are transversely divided, in line with the biannulation of the thoracic segments. Thoracic notosetae are of two kinds; the superior ones are longest and slenderly limbate; the inferior ones are abruptly shorter, and broadly limbate (Fig. 7). Abdominal uncini are avicular, with short, thick base, large, curved fang surmounted by many teeth in four to six transverse rows (Figs. 8, 9), each row with four to seven teeth.

Euchone limicola is an estuarine form, limited to harbor areas, in sandy mud.

Family SERPULIDAE

Genus Spirobranchus Blainville, 1818

Spirobranchus spinosus Moore, 1923

(Plate 7)

Spirabranchus spinosus Moore, 1923:248-250, pl. 18, fig. 47.

Collections: Isthmus Cove, Santa Catalina Island.

This brilliantly multi-colored serpulid is one of the conspicuous encrusting forms along the leeward side of Santa Catalina Island, and along outer, rocky insular coves off southern California. Its hard, stony, white tubes encrust rocky walls at and below intertidal levels. When the animals are extended, they present a variety of red and white banded, or black, blue and brown banded crowns. A slight disturbance at the surface will cause the entire colony to withdraw, revealing the purple-white tubes; these are longitudinally ridged and often diffused with red and blue pigments along the ridges.

The only known account of this species was made from a single imperfect specimen, 23 mm long, taken off Santa Barbara Island, in 29 fms, in fine yellow sand and coralline rock (possibly only from the coralline rock). Because of its abundance at Santa Catalina Island, the species is here more fully described. The body of adult specimens measures 20 to 25 mm long, the radioles being 6.2 mm long. Width in the thorax is 2.5 mm and in the collar region 4 to 5 mm. The tentacular crown has paired, inrolled halves; each consists of 45 to 50 radioles, coiled in about three spirals, and the lateral pinnae are paired with the longest outermost and the shortest innermost and most distal. The radioles are basally united by a palmate membrane for about two-fifths of the total length. The opercular stalk is unpaired (Fig. 1), formed of the dorsalmost left radiole; it terminates in a broad, circular, calcareous disk which extends distally to near the ends of the radioles; the disk has a pair of smaller inner branched spines (Fig. 2), and a pair of larger outer branched spines. The pedicle is cylindrical for half its basal length, then has a pair of broadly expanded lateral wings which extend distally to near the base of the distal disk. The operculum is sometimes partly overgrown with other organisms, especially bryozoans, spirorbids, sponge masses, etc.

The collar membrane is large, consists of a pair of long, broad, dorsolateral lobes, a pair of much smaller lateral lobes, and a pair of large

ventral lobes resembling the dorsal lobes. In damaged, or regenerated specimens these lobes may be otherwise. The thoracic membrane is reduced. The first, or collar, fascicle emerges from the dorsalmost part of the collar membrane; its setae are in thick, projecting tufts; each seta is simple and bayonet-shaped. Segments two to five have smaller notoseta fascicles and neurosetae in transverse, linear ridges; the uncini form a single row of many flat platelets; each uncinus (Fig. 3) consists of a thin rectangular base with a series of twelve teeth along the cutting edge.

The thorax is separated from the abdomen by a long, smooth, apodous region. Abdominal segments are very short, appear crowded, have short uncinial ridges and inconspicuous setal tufts. Abdominal uncini are smaller than thoracic uncini, and each has about seven marginal teeth. Tubes are fully attached to the substratum; they measure about 7 mm across, with the lumen only about 2.5 mm across. Mature females are bright orange red, males pale; the opercular stalk is deep maroon to brown, splashed with white.

Distribution: Long-shore islands of southern California, on rocky surfaces in low intertidal or littoral zones.

ANALYSES, BY AREAS

The San Pedro region is divided into areas which are believed to have unique biological characteristics. Nearly a third of the region is taken over by the San Pedro Basin (Hartman and Barnard, 1958, 1960). Submarine canyons include the San Pedro sea valley, the Newport canyon (Hartman, 1963), and the San Gabriel sea valley (see Map 1). The following areas are here further identified:

LH refers to the Los Angeles-Long Beach outer harbor, a shallow enclosure bounded on the east by the mainland, and on the west by an artificial breakwater.

PV refers to the Palos Verdes shelf and slope, bordered on the east by the Redondo canyon, on the west by the sill of the San Pedro Basin, and on the south by the San Pedro sea valley. It is the site of an important outfall line for Los Angeles County.

SP refers to the San Pedro shelf and slope; it is bordered on the east by the Los Angeles-Long Beach breakwaters, on the south by the Newport canyon, on the north by the Palos Verdes shelf and slope; on the west it surrounds the Lasuen sea mount and Sixmile bank, then continues seaward to the Catalina rise.

NE refers to the Newport shelf, bounded on the east by Newport Bay, on the north by Newport canyon, and on the west by the San Pedro slope; it extends oceanward as part of the San Pedro slope.

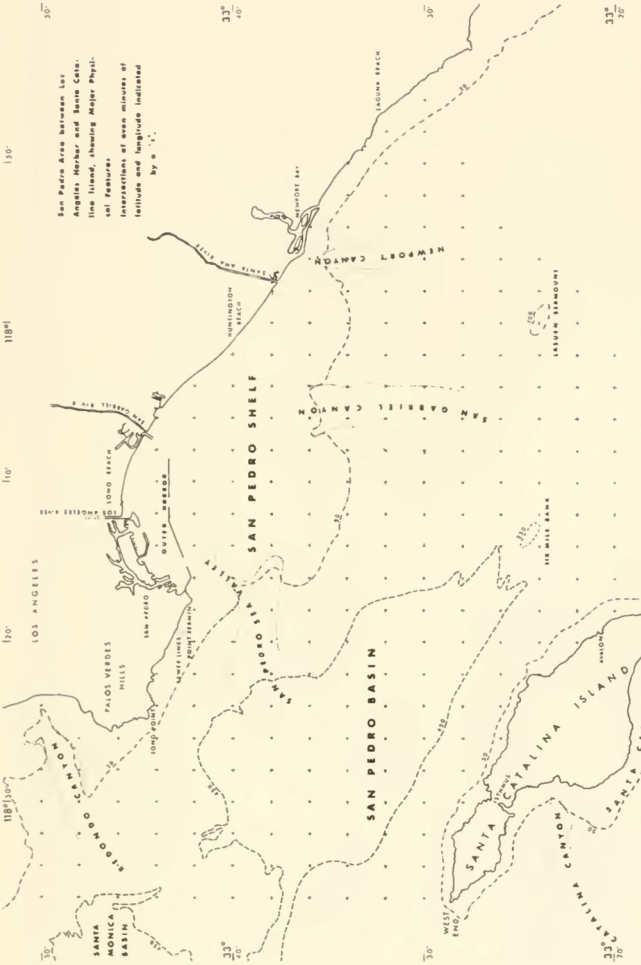
LS refers to the Lasuen seamount, located beyond the outer end of Newport canyon, in depths of 58 to 385 fms, and to Sixmile bank, approximately six miles northeast of Avalon, Santa Catalina Island.

CL refers to the leeward side of Santa Catalina Island. A narrow, long shore shelf borders the island, from East End at the southeast, to West End at the northwest; oceanward the shelf gives rise to the slope which merges with the San Pedro basin (Hartman and Barnard, 1958, 1960).

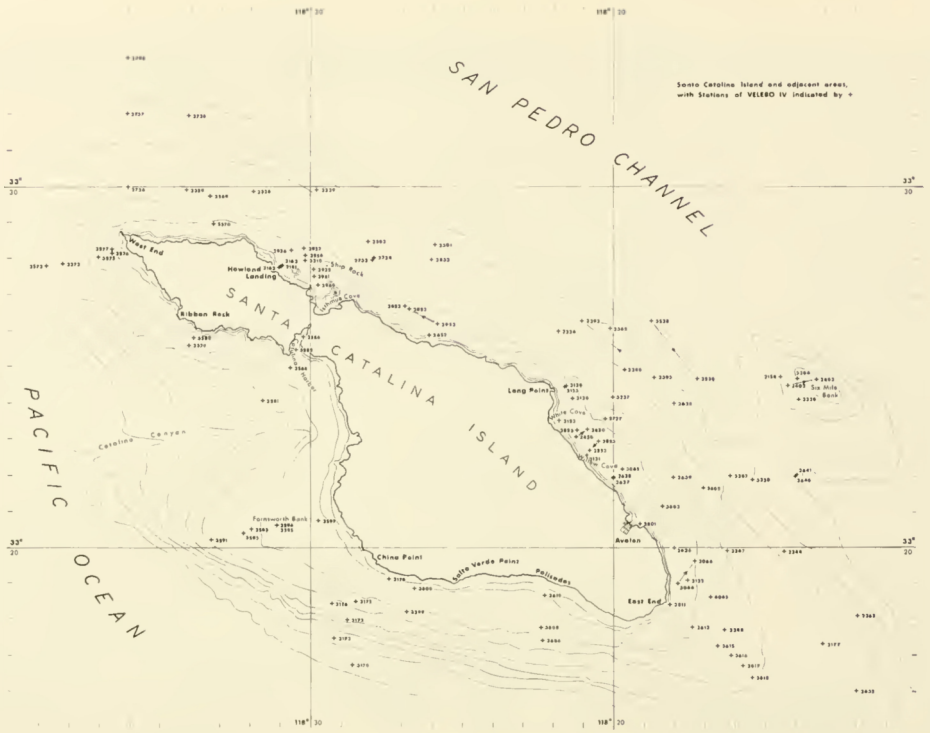
CW refers to the windward side of Santa Catalina Island. The narrow, long shore shelf extends westward as a slope, offshore rocks and banks; it is dissected by the Catalina canyon, and in greater depths it merges with the Catalina basin.

Each of these areas has characteristic associations of organisms, for which the details are explained below.

An inshore area, in 2-5 fm depths, can be recognized as having some species characteristic to it. Analyses for this area have been previously published (California, 1965b, pp. 302-318).



MAP 1. Map of the San Pedro region, showing distribution of areas named in the text. Contour intervals are indicated in fathoms (from Coast and Geodetic Survey map no. 5101).



MAP 2. Map of the Santa Catalina Island area, with contour intervals indicated at 50-fathom intervals. Locations of station numbers of Velero IV are indicated on leeward and windward sides of the island (from Coast and Geodetic Survey map no. 5101).

LOS ANGELES-LONG BEACH OUTER HARBOR

The Los Angeles-Long Beach outer harbor (LH) is a shallow, four to nine fathom deep, artificially constructed basin, located between Terminal Island and the San Pedro shelf. It is separated from the open sea by a breakwater with openings which allow ships and seawater to move freely in and out of the basin. Sediments in the bottom are mainly silty to sticky muds and rubbly shales, except along the shipping lanes, where hard sandy bottoms prevail. Benthic animal populations, taken with the grab, are predominantly annelids of many kinds and in moderate to high numbers; they are accompanied by much smaller numbers of mollusks, crustaceans, and sparse numbers of echinoderms. They are the same kinds as those occurring more abundantly on the San Pedro shelf where the quality of the sediments and proximity to food supplies are similar.

The outer harbor receives much organic and waste materials from the drainage of the Los Angeles and San Gabriel rivers. The effects of pollution on bottom faunas in Alamitos Bay, an arm of the San Gabriel River, have been studied by Reish (1955); the kinds and numbers of animals are much like those in the outer harbor or the shallow, sandy shelf (California, 1959). The fauna is fairly uniform throughout, depending on whether sediments are chiefly mud, clay or sand.

Seven samples were analyzed:

1.[1] Sta. 6107 (near no. 29), in 4 fms. OPG took 2.96 cuft of smooth, black silty mud. Wet weights measured 28 grams, of which polychaetes were 14.7, mollusks 5.4, enteropneusts 4.2 and pinnotherid crabs 3.7 grams. In addition to those listed on the chart, a cumacean (1), a pinnotherid crab (17), and an enteropneust (6) were present. Largest species were *Glycera americana*, an enteropneust, and *Marphysa disjuncta*. Most abundant were *Ancistrosyllis tentaculata* (169), *Haploscoloplos elongatus* (50), and *Cossura candida* (35).

2. Sta. 2314 (no. 32), in 4.5 fms. OPG took 0.56 cuft of mud, silt and many animals. A sea whip (1), *?Harenactis* (24), two kinds of nemerteans (10), amphipods (1), isopod (1), cumaceans (5), ostracods (9), and a pinnixid (7), accompanied the species named on the chart. Largest individuals were *Asychis* sp. and *Praxillella affinis pacifica*; most abundant were *Haploscoloplos elongatus* (82), *Lumbrineris* spp. (61), *Tharyx tesselata* (52), and *Nereis procera* (41).

[1]In all charts, below, the first numbers (i.e. 1-7) refer to those used in the chart-headings. Station numbers (1370 to 7726) are given in the LIST OF STATIONS. The serial numbers, 11 to 267, refer to locations on the grid, vol. 19, pt. 1, p. 6).

Numbers of species and specimens totalled:

polychaetes	46 species,	512 specimens
echinoderms	3	35
mollusks	9	24
crustaceans	6+	32
others	5	44
Total:	69+ species,	647 specimens

3. Sta. 5808 (near no. 30), in 5.8 fms. OPG took 2.52 cuft of dark olive-green silt with many animals. Wet weights totalled 87.6 grams, of which polychaetes comprised 64.1, mollusks 17.5, nemerteans 4.5, and anemones 1.5 grams. A ceriantharian with dark purple stalk and red crown (1), a small anemone (3), *Cerebratulus rubra* (1), a small nemertean (3), a phoronid (2), and an ostracod (3) accompanied the species named on the chart. Largest individuals were *Solen sicarius* and *Cerebratulus rubra.* Most conspicuous were *Diopatra tridentata* and *Compsomyax subdiaphana*, and most abundant were *Marphysa disjuncta* (57), *Tharyx tesselata* (55), *Pectinaria californiensis* (34), and *Chaetozone corona* (32).

Numbers of species and specimens totalled:

polychaetes	33 species,	328 specimens
echinoderms	1	3
mollusks	25	82
crustaceans	1	2
others	5	10
Total:	65 species,	425 specimens

4. Sta. 2508 (no. 29), in 6 fms. OPG took 2.56 cuft of black mud and clay with many animals. A sea-whip (2), ?*Harenactis* (1), a nemertean (3), an amphipod (5), a pinnotherid (1), were present in addition to those listed on the chart. Largest individuals were *Marphysa disjuncta* and *Glycera americana.* Most abundant species were *Tharyx tesselata* (301), *Cossura candida* (24) and *Lumbrineris* ?*zonata* (20).

Numbers of species and specimens totalled:

polychaetes	28 species,	465 specimens
echinoderms	1	1
mollusks	1	2
crustaceans	2	6
others	3	6
Total:	35 species,	480 specimens

5. Sta. 4718 (near no. 33), in 6 fms. OPG took 0.5 cuft of coarse greenish gray sand with much flocculent debris, white branching bryozoans and many animals. In addition to species named in the chart, there were a ceriantharian (1), *?Harenactis* (2), a sea-whip (1), a nemertean (4), a sipunculid (2), *Glottidia albida* (1), 4 kinds of amphipods (8), 2 isopods (4), 4 cumaceans (5), an ostracod (1), a cancroid crab (1), a pycnogonid (5), and an enteropneust (1). Largest species were *Pista disjuncta* and a sea-whip; most abundant were *Tharyx tesselata* (104) and *Mediomastus californiensis* (16).

Numbers of species and specimens totalled:

polychaetes	57 species,	354 specimens
echinoderms	3	5
mollusks	17	46
crustaceans	11	15
others	8	12
Total:	96 species,	432 specimens

6. Sta. 2307 (no. 29), in 7 fms. OPG took 2.1+ cuft of shale, black, friable, rubbly clay and many animals. In addition to species named in the chart, there were *?Harenactis* (2), 2 nemerteans (6), a sipunculid (1), an amphipod (5), a pinnixid crab (1). There were no large individuals. Most abundant were *Cossura candida* (250+), *Nereis procera* (145), *Tharyx tesselata* (more than 100), and *Paraonis gracilis* (92).

Numbers of species and specimens totalled:

polychaetes	49 species,	846 specimens
echinoderms	1	2+
mollusks	9	41
crustaceans	2	6
others	5	10
Total:	66 species,	905+ specimens

7. Sta. 2507 (no. 30), in 8 fms. OPG was filled with black mud, shelly debris and many animals. A large ceriantharian, a nemertean (2), an amphipod (5), a cumacean (2), an ostracod (28), a commensal crab (5), *Callianassa* (1), a pycnogonid (1) and an enteropneust (1) were present, in addition to those listed on the chart. Largest individuals were *Cerebratulus rubra* and *Glycera americana.* Most numerous species were *Marphysa disjuncta, Pectinaria californiensis* and *Cossura candida,* each with 10 individuals.

Numbers of species and specimens totalled:

polychaetes	25 species,	95 specimens
echinoderms	1	6
mollusks	11	27
crustaceans	5	41
others	5	5
Total:	47 species,	174 specimens

Polychaeta in the Los Angeles-Long Beach Outer Harbor, showing order of occurrence in 4 to 8 fms.
+ indicates presence, - absence.
Species represented by more than 10 specimens are indicated by *.

	1	2	3	4	5	6	7
Ancistrosyllis tentaculata	*	-	+	+	+	-	+
Chaetozone corona	*	*	+	+	+	*	-
Chone mollis	+	+	-	-	+	-	-
Cossura candida	*	+	+	+	+	*	*
Dorvillea articulata	+	-	-	-	-	-	-
Drilonereis sp.	+	+	-	-	-	-	-
Eteone ?alba	+	-	-	+	-	-	-
Glycera americana	+	-	+	+	+	+	+
Gyptis a. glabra	+	-	-	+	-	-	+
Haploscoloplos elongatus	*	*	+	+	+	+	+
Harmothoe lunulata	+	+	-	-	+	+	-
Loandalia fauveli	+	-	-	-	-	-	-
Lumbrineris cruzensis	+	-	-	+	+	*	-
Lumbrineris pallida	+	-	-	+	+	-	-
Magelona sacculata	+	-	-	-	-	+	-
Marphysa disjuncta	+	-	-	-	-	-	+
Mediomastus californiensis	+	-	-	+	*	-	-
Notomastus tenuis	+	+	+	+	+	+	-
Paraonis gracilis	+	-	-	-	-	-	-
Pectinaria californiensis	+	-	*	+	+	+	*
Pherusa neopapillata	+	*	+	-	+	*	+
Pilargis hamatus	+	-	-	-	-	-	-
Polydora sp.	+	-	-	-	+	-	-
Prionospio cirrifera	+	+	+	-	-	-	-
Telepsavus costarum	+	-	+	-	+	+	-
Tharyx tesselata	*	*	+	+	*	*	*
Amphicteis scaphobranchiata	.	+	+	-	+	*	+
Anaitides sp., checkered	.	+	-	-	-	-	-
Anotomastus gordiodes	.	+	-	-	+	-	-

Polychaeta in Los Angeles-Long Beach Outer Harbor (continued)

	1	2	3	4	5	6	7
Aricidea lopezi		+	-	-	+	+	-
Aricidea, other sp.		+	-	-	-	-	-
Asychis sp.		+	-	-	+	-	-
Brada pilosa		*	-	-	-	-	-
Cirrophorus furcatus		+	-	-	+	-	-
Glycera ?capitata		+	-	-	-	-	-
Goniada brunnea		+	-	-	+	-	-
Goniada littorea		+	-	-	-	-	-
Laonice cirrata		*	+	+	+	+	+
Lumbrineris californiensis		+	-	-	+	+	-
Lumbrineris limicola		*	*	-	-	+	+
Lumbrineris minima		*	-	-	-	-	+
Nephtys cornuta		*	-	-	-	-	-
Nereis procera		*	+	+	+	*	+
Nothria iridescens		+	-	-	+	-	-
Pholoe glabra		+	-	+	-	-	+
Pista cf. cristata		+	-	-	-	+	-
Polydora ?limicola		+	-	-	-	-	-
Praxillella a. pacifica		+	-	+	-	-	-
Prionospio malmgreni		+	-	-	+	+	-
Prionospio pinnata		*	+	+	+	+	-
Scalibregma inflatum		+	-	+	+	-	-
Sphaerosyllis sp.		+	-	-	-	-	-
Spiophanes fimbriata		+	-	+	-	-	+
Spiophanes missionensis		+	+	-	+	+	-
Sternaspis fossor		+	-	-	+	-	-
Sthenelanella uniformis		+	+	-	+	+	-
Streblosoma sp.		+	-	-	-	-	+
Terebellides stroemii		+	-	+	-	-	+
Ampharete sp.			+	-	-	-	-
Boccardia basilaria			+	-	-	-	-

Polychaeta in Los Angeles-Long Beach Outer Harbor (continued)

	1	2	3	4	5	6	7
Diopatra tridentata			+	-	-	-	-
Harmothoe priops			+	-	-	-	+
Marphysa disjuncta			*	*	-	*	-
Ninoe gemmea			+	-	-	-	-
onuphid			+	-	-	-	-
Paraonis gracilis			+	-	-	-	-
phyllodocid			+	-	-	-	-
Pista disjuncta			+	-	*	-	-
Poecilochaetus johnsoni			+	-	-	-	-
Streblosoma crassibranchia			+	-	-	+	-
Tharyx monilaris			+	-	+	+	-
Ampharete labrops				+	-	+	-
Diopatra ornata				+	+	-	-
Drilonereis ?longa				+	-	-	-
Lumbrineris ?zonata				*	-	-	-
Nephtys ferruginea				+	-	-	-
Polycirrus sp.				+	+	-	-
Amaeana occidentalis					+	+	-
Anaitides, sp. B [trilineate]					+	-	-
Arabella semimaculata					+	-	-
Aricidea neosuecica					+	-	+
Boccardia sp.					+	+	+
Chone gracilis					+	-	-
Cirriformia spirabrancha					+	-	-
Eteone californica					+	+	-
Eteone ?dilatae					+	-	-
Eumida bifoliata					+	-	-
Maldane sarsi					+	-	-
Melinna denticulata					+	-	-
Nephtys caecoides					+	-	-
Owenia f. collaris					+	-	-

Polychaeta in Los Angeles-Long Beach Outer Harbor (continued)

	1	2	3	4	5	6	7
Pherusa capulata					+	-	-
Pilargis maculata					+	-	-
Prionospio pygmaeus					*	-	-
Schistocomus hiltoni					+	-	-
Ancistrosyllis sp.						*	-
Armandia bioculata						+	-
Boccardia nr. redeki						+	-
Carazzia sp.						+	-
Cirratulus cirratus						*	-
Cirriformia luxuriosa						+	-
Diopatra tridentata						+	+
Dorvillea articulata						*	-
?Fabricia sp.						+	-
Megalomma sp.						+	-
Melinna sp.						+	-
Nephtys sp.						*	-
Ophiodromus pugettensis						*	-
Paraonis gracilis						*	-
Peisidice aspera						*	-
Polydora nr. armata						+	-
Polydora citrona						+	-
Polydora ligni						+	-
Travisia sp.						+	-
Drilonereis cf. nuda							+
Magelona sp.							+
Pilargis berkeleyi							+

Echinodermata in the Los Angeles-Long Beach Outer Harbor, showing order of occurrence in 4 to 8 fms.

Dendraster excentricus	+	-	-	-	-	-	-
Amphiodia urtica		*	+	-	+	-	-
Pentamera pseudopopulifera		+	-	-	-	-	-

Echinodermata in Los Angeles-Long Beach Outer Harbor (continued)

	1	2	3	4	5	6	7
ophiuroid				+	-	+	-
Amphiodia occidentalis					+	-	-
Pachythyone rubra					+	-	-
Amphiodia digitata							+

Mollusca in the Los Angeles-Long Beach Outer Harbor, showing order of occurrence in 4 to 8 fms.

Asthenothaerus villosior	+	-	-	-	-	-	-
Chione undatella	+	-	-	-	-	-	-
Compsomyax subdiaphana	+	+	+	-	-	*	+
Cylichna attonsa	+	-	-	-	-	-	-
Lucinisca nuttalli	+	-	+	-	+	-	-
Macoma yoldiformis	+	+	+	-	+	-	-
Nassarius cooperi	+	-	+	-	-	-	-
Nassarius perpinguis	+	-	-	-	+	-	+
Nuculana taphria	+	-	-	-	-	+	-
Olivella baetica	+	-	+	-	-	-	+
Rochefortia sp.	+	-	+	-	-	-	-
Thyasira sp.	+	-	+	-	-	-	-
Turbonilla sp.	+	+	+	-	+	-	-
Aglaja sp.		+	-	-	-	-	-
Balcis rutila		+	-	-	-	-	-
Cadulus fusiformis		+	-	-	-	-	-
Cylichna diegensis		+	-	-	-	-	-
Lyonsia californica		+	-	-	+	-	-
Tellina idae		+	-	-	-	-	-
Aceton punctocoelata			+	-	*	-	+
Adontorhina cyclia			+	-	-	+	-
Cadulus sp.			+	-	+	-	-
Chione undatella			*	-	-	-	-
Crepidula sp.			+	-	-	-	-
Dentalium sp.			+	-	-	-	-

Mollusca in Los Angeles-Long Beach Outer Harbor (continued)

	1	2	3	4	5	6	7
Macoma sp.			+	-	-	-	-
Mangelia sp.			+	-	-	-	-
Odostomia sp.			+	-	+	-	-
Periploma discus			+	-	-	-	+
pholad			+	-	-	-	-
?Poromya sp.			+	-	-	-	-
Solamen columbianum			+	-	+	-	-
Solen sicarius			+	-	-	-	-
Tellina carpenteri			+	-	-	-	-
Vitrinella sp.			+	-	-	-	-
clam			+	-	-	-	-
Macoma indentata				+	-	+	-
Chlamys sp.					+	-	-
?Kellia sp.					+	-	-
Macoma nasuta					+	-	-
Mactra ?californica					+	-	-
Mangelia barbarensis					+	-	-
Modiolus sp.					+	-	-
Ophiodermella incisa					+	-	-
Crepidula aculeata						+	-
Lucinoma annulata						+	-
Protothaca tenerrima						*	-
Solen rosaceus						+	-
Tagelus californicus						+	-
Cadulus fusiformis							+
Modiolus neglectus							+
Parvilucina tenuisculpta							+
Tellina buttoni							+
Thyasira barbarensis							+
Volvulella tenuissima							+

PALOS VERDES SHELF AND SLOPE

The Palos Verdes shelf (PV), in depths of 7 to 10 fms, supports conspicuous *Chaetopterus* associations consisting chiefly of this genus with other kinds of polychaetes. In its shallowest part, where sediments are somewhat sandy, the parchment-worm is associated with enteropneusts harboring pinnotherid crabs, the large swarming nereid, *Neanthes brandti*, juvenile sand-dollars *Dendraster excentricus*, a tubicolous annelid *Eupolymnia crescentis* with a commensal polynoid *Halosydna brevisetosa*, the proboscis worms, *Glycera americana* and *G. robusta*, and small spioniform worms, especially species of *Polydora* and *Prionospio*. At about 10 fms, the parchment-worm is associated with the case-building clam *Lima dehiscens*, and the worms *Myxicola infundibulum* and *Golfingia ?hespera*; in bottoms where rocks and gravel occur, it is present with gorgonian coelenterates, *Telepsavus costarum* and *Phyllochaetopterus prolifica*.

In depths of 11 to 20 fms, *Chaetopterus* is associated with decreasing numbers of *Lima dehiscens* and, where gravel or rocks occur, with the spiny ophiuroid, *Ophiothrix spiculata*, the elbow crab, *Heterocrypta occidentalis*, the cone-snail, *Conus californicus*, other mollusks, including *Nassarius*, *Megasurcula*, *Polinices*, together with large nemerteans, *Cerebratulus rubra*, the large cageworm, *Pherusa capulata*, as well as many other kinds of polychaetes, anemones of several kinds, and sipunculids. Red-brown sands support *Sipunculus nudus*, *Lytechinus anamesus*, other ophiuroids, and many kinds of shelf-polychaetes. In depths of 14 to 20 fms, a sea-star, *Astropecten californicus*, ophiuroids, such as *Amphioplus hexacanthus*, *Amphipholis squamata* and *Amphiodia urtica*, are prominent, together with increasing numbers of small crustaceans and polychaetes.

In 21 to 30 fms, the sediments of the Palos Verdes shelf are black muds with odor of hydrogen sulfide, flocculent black debris and decaying vegetation. Animals are chiefly polychaetes, *Dorvillea articulata*, *Ampharete arctica*, *Lumbrineris pallida*, other *Lumbrineris* species, *Ophiodromus pugettensis*, *Boccardia basilaria*, *Tharyx* species, *Diopatra ornata*, and other smaller polychaetes, associated with a clam, *Solemya* sp., sipunculids, and *Amphiodia urtica*. At this depth *Chaetopterus* and crustaceans are nearly absent.

In 31 to 40 fms the animals in the sediments are mainly polychaetes, especially cirratulids, spionids, some *Pectinaria californiensis*, and nemerteans, such as the large *Cerebratulus*; surface forms include *Chlocia pinnata*, *Ophiothrix spiculata*, and the large sea-whip, *Stylatula*. Crusta-

cea are absent except for the barnacle, *Scalpellum*, attached to stiff tubes of polychaetes.

In deeper bottoms, sediments are silt and mud; polychaetes continue the most prominent, and occur with ophiuroids, echiuroids, sipunculids, small solenogasters and coelenterates. The most conspicuous polychaetes are *Chloeia pinnata*, *Lumbrineris pallida*, *Spiophanes* and *Tharyx* species, together with onuphids and maldanids. Brissopsids are frequent, as well as large echiuroids, *Arynchite*, and nemerteans, *Cerebratulus*. Characteristic animals in 195 fms are the large mud-tube polychaetes, *Pista disjuncta* and *Maldane sarsi*, and a tubicolous ceriantharian.

Specific diversity ranges from 25 to 129 in a sample, and numerical count from 100 to 2448. Biomasses are moderately high, ranging to 840.0 grams for a sample measuring 0.16 cuft.

The following stations, by depth, were useful in indicating the diversity and kinds of species in the Palos Verdes area; they are numbered 1 to 27 (see charts), with station (4801-57 to 4832-57) and serial number (11 to 60) (see Map, vol. 19, p. 6).

1. Sta. 4801 (no. 28). 0.3 mi offshore from Portuguese Point, in 7 fms. OPG took 1.0 cuft of organic debris, shelly silty mud and red algae. In addition to species shown on the chart, the sample contained a small anemone (1), nemerteans (10), four kinds of amphipods (20 specimens), a *Caprella* (11), a tanaid (1), and a cumacean (2).

Numbers of species and specimens were estimated at:

polychaetes	34+ species,	381 specimens
echinoderm	1	84
mollusks	6	11
crustaceans	7	34
others	2	11
Total:	50+ species,	521 specimens

The most conspicuous was *Chaetopterus*, followed by *Diopatra* and juveniles of *Dendraster*. The most abundant were *Tharyx marioni* (91), *Dendraster* sp. (84), *Ophiodromus pugettensis* (56), with 20 or more of each of the following: *Chaetopterus variopedatus*, *Eupolymnia crescentis* and *Halosydna brevisetosa*.

2. Sta. 4830 (no. 28). 2.5 mi from Pt. Vicente light, in 7 fms. OPG took 0.95 cuft of fine olive-gray sand. The screenings contained large numbers of *Dendraster* sp. and other animals. In addition to those shown

on the chart, crustaceans were represented by many amphipods and caprellids, and a crab, *Heterocrypta occidentalis*. Largest species were *Polinices* and *Neanthes brandti*; most abundant were *Polydora ?caulleryi* (312+) and *Diopatra ornata* (37).

3. Sta. 4806 (no. 28). 1.25 mi from Pt. Vicente light, in 7.5 fms. OPG took 1.8 cuft of debris with many algae, large tubes of *Chaetopterus variopedatus* and *Lima dehiscens* in cases. In addition to those listed on the chart, coelenterates were represented by a small anemone (2) and a ceriantharian (1); polyclads by two species, nemerteans by three species, oligochaetes by one, and *Glottidia albida* (1); bryozoans were also present. Amphipods were estimated at 11 species and 128 specimens, and decapods at two small individuals; one enteropneust was present. The largest species was *Chaetopterus variopedatus* and the most abundant *Dorvillea articulata* (754 individuals), followed by *Chaetopterus* with about 100, *Lima dehiscens* with 90, *Diopatra ornata* and *Ophiodromus pugettensis* with 54 each, *Flabelligera commensalis* with 46, and *Lumbrineris cruzensis* with 53.

Numbers of species and specimens totalled:

polychaetes	51 species,	1509 specimens
echinoderms	3	7
mollusks	22	277
crustaceans	14	130
others	12	94
Total:	102 species,	2017 specimens

Sub. 3. Sta. 4833 (no. 27). 0.6 mi from Pt. Vicente light, in 8.5 fms. OPG took 0.95 cuft of coarse gray sand, which contained chiefly *Dendraster excentricus* and *Chaetopterus variopedatus*, also a few small pelecypods.

4. Sta. 4807 (no. 28). Off Pt. Vicente light, in 9 fms. OPG took 2.4 cuft of massed *Chaetopterus* tubes with gravelly sand. The sample contained nemerteans of 3 kinds and many specimens, a sipunculid, crustaceans with 1 amphipod, 10 caprellids, and a large brown enteropneust (2), in addition to the animals listed on the chart. The largest and most conspicuous individuals were *Chaetopterus variopedatus* (ca. 100) and *Lima dehiscens* (about 40). Other numerous species were *Dorvillea articulata*, *Lumbrineris pallida*, *Ophiodromus pugettensis*, *Telepsavus costarum*, *Tharyx multifilis*, and nemerteans of at least 3 kinds.

Numbers of species and specimens totalled:

polychaetes	22 species,	240+ specimens
echinoderms	2	4
mollusks	6	61
others	3	13+
Total:	33 species,	318+ specimens

5. Sta. 2788 (no. 14). South of Redondo Beach, in 9.5 fms. OPG took 1.32 cuft of coarse gray sand and shell, with dead shells of *Olivella*, *Pecten*, *Cadulus*, *Nassarius*, *Dendraster* occupied by sipunculids, and solitary tunicates. The sample contained many worm-like animals, with the most numerous being *Golfingia* (sipunculid), *Pisione remota* (50), cirratulids and hesionids. Crustaceans included several kinds of amphipods with 34 specimens and a caprellid, and an anemone (1). Largest individual was *Marphysa mortenseni*.

Sub 5. Sta. 2470 (no. 44). 1.4 mi E of Pt. Fermin light, in 10 fms. OPG took 1.95 cuft of black sandy mud with foul odor. Most abundant were many kinds of polychaetes, like those in adjacent stations, with unusual abundance of *Lumbrineris* spp., *Streblosoma crassibranchia*, and an enteropneust, possibly *Spengelia* sp.

6. Sta. 4805 (no. 28). 1.8 mi from Pt. Vicente light, in 10 fms. OPG took 1.8 cuft of *Chaetopterus-Diopatra ornata* association in sand with red algae. A few small ?*Harenactis* (anemone), a large speckled gray nemertean, several smaller ones, and two kinds of sipunculids, accompanied by large numbers of polychaetes and *Lima dehiscens*, comprised most of the sample. Crustaceans were present with a few amphipods, a *Caprella*, and *Heterocrypta occidentalis* (3). The largest and most conspicuous animals were *Chaetopterus variopedatus*, *Lima dehiscens*, *Chone* sp., *Flabelligera commensalis*, *Spiophanes missionensis* and *Tharyx multifilis*. Echinoderms were absent.

7. Sta. 4856 (near no. 28). 2.9 mi from Pt. Vicente light, in 10 fms. OPG took 0.81 cuft of fine olive-green sand and rocks with small white attached sponges. In addition to those on the chart, the lot contained a small white anemone (2), a large *Cerebratulus rubra* and a small nemertean (10), *Glottidia albida* (1), *Terebratalia* sp. (5), ten kinds of amphipods (77), two cumaceans, an isopod (15), an ostracod, an elbow crab (2) and a spider crab, a pycnogonid (6), and a large dark brown enteropneust (1). The largest species were *Burchia redondoensis* and *Pista disjuncta*, the most abundant *Paraonis gracilis* (50+), *Prionospio malmgreni* (45), and *Ophiothrix spiculata* (29).

Numbers of species and specimens totalled:

polychaetes	54 species,	350 specimens
echinoderms	4	47
mollusks	17	34
crustaceans	20	99
others	10	40
Total:	105 species,	570 specimens

8. Sta. 3050 (near no. 28). 2.1 mi west of Pt. Fermin light, in 10-11 fms, dredged, in rocky and mixed bottom. Gorgonian corals (*Leptogorgia hebes*) were most conspicuous; other species are listed on the chart.

9. Sta. 2472 (no. 28). 2.25 mi E of Pt. Vicente light, in 11 fms. OPG took 0.63 cuft of coarse black sandy mud with broken shells and many animals. In addition to those shown on the chart, the sample contained a few small anemones, several kinds of nemerteans, *Glottidia albida* (1), and few crustaceans (amphipods, caprellids, ostracods, and *Heterocrypta occidentalis*). Echinoderms were absent.

10. Sta. 5102 (near no. 28). 3.35 mi from Pt. Vicente light, in 11 fms. OPG took 0.25 cuft of coarse black sand, with tubes of *Chaetopterus*. A ceriantharian (2), a polyclad (6), at least two kinds of nemerteans (21), a sipunculid (4), an oligochaete (30+), caprellids (100+), an amphipod (1), and *Heterocrypta occidentalis* (2), were present in addition to those listed in the chart. The largest species was *Polinices*; the most conspicuous *Chaetopterus variopedatus* (65); the most abundant *Dorvillea articulata* (550+), *Sphaerosyllis californiensis* (100+), *Paraonis gracilis* (85+), and *Lima dehiscens* (41). Echinoderms were nearly absent.

Numbers of species and specimens totalled:

polychaetes	60+ species,	4200+ specimens
echinoderms	1	2
mollusks	15	79
crustaceans	3+	103+
others	8	64+
Total:	87+ species,	4448+ specimens

Sub 10. Sta. 5101 (near no. 28). 1.85 mi from Abalone Cove, in 11 fms. OPG took 0.88 cuft of coarse gray-black sand with many animals. Screenings consisted of large clumps of *Chaetopterus variopedatus* with *Lima dehiscens*, a tubicolous ceriantharian, nemerteans of several kinds,

sipunculids, many kinds of polychaetes, resembling those in adjacent samples, *Heterocrypta occidentalis*, and many other smaller kinds.

11. Sta. 4802 (near no. 27). Near Marineland, in 12 fms. OPG took 2.2 cuft of mixed gravel and sand, tubicolous polychaetes and massed cases of *Lima*. In addition to those listed on the chart, there were two small anemones, a polyclad (3), two kinds of nemerteans, a sipunculid, three kinds of amphipods (7), two caprellids (8), a tanaid (1), *Heterocrypta* sp. (3). Most conspicuous species were *Chaetopterus variopedatus* and tubes of *Polyodontes*; most abundant were *Ampharete* (100+), and *Flabelligera commensalis*, *Lumbrineris pallida*, *Ophiodromus pugettensis* and *Lima dehiscens*, each with more than 10.

Numbers of species and specimens totalled:

polychaetes	31+ species,	300+ specimens
echinoderms	1	1
mollusks	14	103
crustaceans	7	19
others	4	10
Total:	57+ species,	433+ specimens

12. Sta. 5030 (near no. 43). 2.7 mi from Pt. Fermin, in 12 fms. OPG took 1.13 cuft of gray and black sand with tubes of *Chaetopterus*. The sample contained a ceriantharian, small nemerteans (5), a sipunculid (5), an oligochaete (10+), five kinds of amphipods (20), a caprellid (3), two kinds of isopods (8), *Heterocrypta* (1), a shrimp (4), a pycnogonid (1), an enteropneust (1). Largest and most conspicuous species was *Chaetopterus*; most abundant were *Exogone uniformis* (78), *Dorvillea articulata* (70), *Melinna denticulata* (35), and *Conus californicus* (33).

Numbers of species and specimens were estimated at:

polychaetes	47+ species,	468+ specimens
echinoderms	3	20
mollusks	24	128
crustaceans	10	33
others	7	24
Total:	91+ species,	673+ specimens

13. Sta. 5541 (no. 28). 8.8 mi from Pt. Fermin light, in 12 fms. OPG took 1.63 cuft of coarse black sand with odor of hydrogen sulfide.

The wet weights of larger animals were:

ceriantharian (1)	7.0 grams
Cerebratulus (2)	5.7
?*Golfingia hespera* (245)	106.0
polychaetes, without tubes	617.6
echinoderms	0.5
decapods	32.0
Total:	768.8 grams

In addition to those listed in the charts, the sample contained: a large ceriantharian, a small white anemone, *Cerebratulus* (2), small nemerteans (10+), two kinds of sipunculids (256), five kinds of amphipods (42), an isopod (1), a tanaid (1), *Cancer* sp. (3), *Heterocrypta occidentalis* (14), *Scalpellum* (1), a shrimp (3). Largest species were *Pherusa capulata*, *Myxicola infundibulum*, *Cerebratulus*, ceriantharian and *Heterocrypta*; most abundant were *Chaetopterus* (200), *Phyllochaetopterus prolifica* (100+) and *Telepsavus costarum* (100+).

Numbers of species and specimens totalled:

polychaetes	28 species,	ca. 686 specimens
echinoderms	2	3
mollusks	12+	156
crustaceans	ca. 12	65
others	6	270
Total:	ca. 60 species,	ca. 1180 specimens

14. Sta. 5028 (near no. 43), 0.9 mi from Pt. Fermin light, in 12 fms. OPG took 0.1 cuft of coarse, gray-black sand, with many tubes of *Chaetopterus*. Coelenterates were represented by a small *Harenactis* and another anemone (3); two kinds of polyclads (3), a nemertean (5), two kinds of sipunculids (83), an oligochaete (10), an amphipod (10), a caprellid (6), and *Glottidia albida* (3). The largest species was *Chaetopterus*, the most abundant *Pherusa neopapillata* (197), *Dorvillea articulata* (130), *Golfingia* (79), *Ampharete labrops* (50), and *Sphaerosyllis californiensis* (66). Echinoderms, mollusks and crustaceans were nearly absent.

Numbers of species and specimens totalled:

polychaetes	54 species,	797 specimens
echinoderms	1	1
mollusks	7	8
crustaceans	2	16
others	10	114
Total:	74 species,	936 specimens

15. Sta. 3051 (no. 42). 2.4 mi off Pt. Fermin light, in 11-12.5 fms. Biol. dredge with tangles, took large quantities of *Chaetopterus* with associated animals. In addition to those on the chart, crustaceans were represented by a few *Heterocrypta*, amphipods, isopods. The most conspicuous animals were *Chaetopterus*, *Diopatra ornata* and *Ophiothrix spiculata*.

Sub 15. Sta. 2473 (no. 27). 0.75 mi SE of Pt. Vicente light, in 16 fms. OPG took 0.75 cuft of coarse sandy mud, shell fragments, and *Chaetopterus* with *Ophiothrix* (see Hartman, 1955: 53).

Sub 15. Sta. 2962-54 (near no. 42). 1.5 mi W of Pt. Fermin light, in 20 fms. Biological dredge took black mud with *Chaetopterus*, large *Stylatula*, *Listriolobus pelodes*, sipunculids, *Modiolus* and a few other pelecypods, also many polychaetes. Echinoderms and crustaceans were nearly absent.

16. Sta. 3049 (no. 42). 2.1 mi from Pt. Fermin light, in 23 fms. OPG took a small volume of black mud with dead shells of *Lima*, *Modiolus*, *Solen*, *Polinices*, *Olivella*, *Pecten*, scaphopod and caecid shells. The sample contained *Stylatula* (4, very long), a ceriantharian (2), polyclads (10), few amphipods and cumaceans, and others listed on the chart. The largest individuals were *Stylatula* and ceriantharian. Most abundant were *Capitella capitata* subsp. (985), *Dorvillea articulata* (700+), and *Ampharete arctica* (200+).

17. Sta. 4803 (no. 27). 1.6 mi from Pt. Vicente light, in 24 fms. OPG took 2.2 cuft of black detrital flocculent debris with foul odor. The sample contained large *Stylatula* (6), measuring to 50 cm long, a large *Cerebratulus rubra*, and smaller nemerteans, a caprellid (3), and other species shown on the chart. Most abundant species were *Dorvillea articulata* (100+), *Lumbrineris pallida* (20+), *Phyllochaetopterus limicolus*, and *Tharyx* spp. (70+).

18. Sta. 5096 (near no. 28). 2.5 mi from Pt. Fermin light, in 25 fms. OPG took 1.57 cuft black silt with many small animals. A sea

whip (1), a polyclad (3), two kinds of nemerteans (15), a sipunculid (1), were present in addition to those listed on the chart. The largest individual was the sea whip, the most abundant species *Dorvillea articulata* (437), *Capitella capitata* subsp. (190+), and *Telepsavus costarum* (64). The rare cirratulid, *Raricirrus maculata*, was well represented (51).

19. Sta. 2417 (no. 42). Off Pt. Fermin light, in 34 fms. OPG took 2.14 cuft of black mud. A slender sea whip (3), a polyclad (1), and nemerteans (2+), accompanied the species listed on the chart. The largest animal was *Molpadia intermedia*, the most abundant species *Tharyx* spp. (1620+) and *Spiophanes* (100+). Crustaceans and echinoderms were nearly absent.

20. Sta. 5027 (near no. 42). 1.9 mi from Pt. Fermin light, in 38 fms. OPG took 1.82 cuft of green-black silty sand. A large *Stylatula* (1), ?*Harenactis* (1), *Cerebratulus rubra* (1), and two other smaller nemerteans (30), a phoronid (4), a hirudinean (1), an amphipod (2), a caprellid (1), *Scalpellum* (12), were taken in addition to those listed on the chart. Largest individuals were *Cerebratulus rubra* and *Stylatula* spp. Most abundant species were *Tharyx multifilis* (2634) and *Spiophanes* spp. (214).

Numbers of species and specimens totalled:

polychaetes	63 species,	3357 specimens
mollusks	12	30
crustaceans	5	34
others	8	43
Total:	88 species,	3464 specimens

21. Sta. 4855 (no. 12). 3.8 mi from Pt. Vicente light, in 39 fms. OPG took 1.26 cuft of fine gray sand with detritus. Coelenterates were represented by *Monobrachium parasitum* (many, on a bivalve), ?*Harenactis* (1); a polyclad (2), two kinds of nemerteans (13), a sipunculid (4), nine kinds of amphipods (52), three kinds of cumaceans (13), three kinds of isopods (45), tanaids (7), two kinds of ostracods (12), a shrimp (1), were also present. The largest animals were *Aphrodita refulgida* and *Amphiura arcystata*. Most conspicuous and abundant species were *Chloeia pinnata* (126) and *Spiophanes missionensis* (56).

Numbers of species and specimens totalled:

polychaetes	76 species,	675 specimens
echinoderms	7	24
mollusks	21	55
crustaceans	20	131
others	5	20
Total:	129 species,	905 specimens

22. Sta. 5502 (no. 42). 2 mi from Pt. Fermin light, in 49 fms. OPG took 2.39 cuft of green silty sand. Nemerteans included a large *Cerebratulus* (1), a small, red-banded (4), and a longitudinally striped one. A sipunculid (1), and *Branchiostoma* (1) were also present, in addition to those listed on the chart. Largest animal was *Pherusa capulata*, and most conspicuous was *Chlocia pinnata* (320); *Tharyx tesselata* was the most abundant (1700+). Echinoderms and crustaceans were sparse or absent.

23. Sta. 5029 (no. 41). 2.95 mi from Pt. Fermin light, in 50 fms. OPG took 1.76 cuft of fine greenish black silty sand with flocculent debris. In addition to those listed on the chart, the sample contained *Cerebratulus* (2 large, weighing 11 grams), and another small kind (many), also two kinds of sipunculids (2). The largest individual was *Cerebratulus*, the most abundant species *Capitella capitata* subsp. (300), *Dorvillea articulata* (110), and *Spiophanes missionensis* (75+). Echinoderms were absent, and crustaceans were represented only by large *Scalpellum* (5). Mollusks were few and small. Total numbers were estimated at 38 species and 803 specimens.

24. Sta. 2430 (no. 60). 2.3 mi off Pt. Fermin, in 80 fms. OPG took 1.44 cuft of hard-packed mud with many animals. In addition to those listed on the chart, there was a nemertean (2 small), four kinds of amphipods (25), an anthurid isopod (1), a tanaid (1), and an octracod (1). There was no conspicuously large individual, and none were outstandingly abundant. Total numbers were estimated at 41+ species, and 185+ specimens.

25. Sta. 4854 (near no. 11). 5.25 mi from Pt. Vicente, in 98 fms. OPG took 1.57 cuft of dark gray silty sand, gravel and rocks. The grab was lowered twice. Nine colonies of *Monobrachium* were recovered on *Pseudopythina* sp.; others present were a nemertean (2), an echiuroid, *Arynchite* (2, measuring 62 mm long), three kinds of amphipods (4), an isopod (1), a cumacean (5), and ostracods (4). The largest indi-

viduals were brissopsids, *Arynchite* and *Travisia pupa*. The most conspicuous species was *Amphiodia digitata* and the most abundant were *Tharyx tesselata* (100+), and onuphids (65+). Total numbers were estimated at 76 species and more than 600 specimens.

26. Sta. 4831 (near no. 41). 3.6 mi from Pt. Vicente light, in 195 fms. OPG took 2.83 cuft of olive-green silt. A ceriantharian (1), *Cerebratulus* sp. (4), and a small nemertean (2+) were taken, in addition to the species listed below. Largest individual was *Eunice americana*, and most abundant species was *Pectinaria californiensis* (25).

Numbers of species and specimens totalled:

polychaetes	19 species,	85 specimens
echinoderms	2	3
mollusks	1	4
others	3	8
Total:	25 species,	100 specimens

27. Sta. 4832 (near no. 19). 2.2 mi from Pt. Vicente light, in 195 fms. OPG took 1.32 cuft olive-green sandy and sticky silt. No large animal was present. In addition to those listed below, there were a ceriantharian (1), a white polyclad (1), and an echiuroid (1). Most abundant were *Chloeia pinnata* (96), and *Pista disjuncta* (54).

Numbers of species and specimens totalled:

polychaetes	15 species,	254 specimens
echinoderms	6	48
mollusks	10	67
others	3	3
Total:	34 species,	372 specimens

Polychaeta in the Palos Verdes shelf and slope, showing order of occurrence in 7 to 195 fms
+ indicates presence, - absence. Species represented by more than 10 specimens are indicated by *.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Amphiduros pacificus	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anotomastus gordiodes	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aricidea spp.	+	+	-	-	*	-	-	-	+	-	+	-	-	*	-	+	-	-	-	-	-	-	-	-	+	-	-
Boccardia sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Capitella capitata, subsp. or C. sp.	+	-	-	-	-	-	-	-	-	-	-	+	-	+	-	*	-	*	+	+	-	+	*	-	-	-	-
Chaetopterus variopedatus	*	+	*	*	-	*	+	-	-	*	*	*	*	*	*	+	+	-	-	+	-	-	+	-	-	-	-
Chaetozone, oculate	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chone gracilis or C. spp.	*	*	*	-	-	*	-	+	-	+	+	-	+	*	+	-	+	-	*	-	-	-	-	-	+	-	-
Diopatra ornata	+	*	*	+	-	+	*	-	-	*	-	+	+	+	+	+	+	+	+	+	-	+	-	-	+	-	-
Dorvillea articulata	*	+	*	*	*	-	+	+	-	*	*	*	*	*	+	*	*	*	+	*	-	*	*	-	-	+	-
Eumida sanguinea	*	-	-	-	-	+	-	+	-	-	-	-	-	+	-	*	-	-	+	+	-	-	+	-	-	-	-
Eupolymnia crescentis	+	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flabelligera commensalis	+	-	*	-	-	+	+	+	-	*	*	+	+	+	+	+	-	+	+	+	+	-	-	-	-	-	-
Goniada littorea	*	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Gyptis a. glabra	+	-	+	*	-	-	-	+	+	*	*	+	*	-	-	*	-	*	-	+	+	*	+	-	-	+	-
Halosydna brevisetosa	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Haploscoloplos elongatus	*	-	+	-	-	-	-	-	-	+	+	+	-	+	-	-	-	-	-	-	+	-	-	-	+	+	+
Harmothoe sp.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Lumbrineris limicola	+	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris pallida	+	-	+	+	-	-	-	-	-	-	*	+	-	*	-	-	*	+	-	+	-	+	*	-	-	-	-
Lumbrineris, other spp.	+	*	-	-	+	+	-	+	+	*	-	-	-	-	+	*	-	-	+	-	-	-	-	*	+	+	*
Nephtys spp.	+	-	+	-	+	-	+	-	+	+	-	-	-	-	-	-	-	-	-	-	*	-	-	+	+	+	+
Notomastus magnus	+	-	+	+	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiodromus pugettensis	*	+	*	+	-	+	*	+	-	*	*	-	-	*	+	*	-	-	*	-	-	*	+	-	-	-	-
Pherusa neopapillata	+	+	-	-	-	+	*	-	-	+	-	+	*	*	-	-	-	+	+	+	-	-	+	+	-	-	-
Platynereis bicanaliculata	+	-	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Polydora spp.	+	-	-	+	-	-	-	+	-	*	+	-	+	+	+	-	-	+	-	*	+	*	-	-	+	-	-
Prionospio malmgreni	+	-	*	+	-	-	*	-	+	*	*	+	-	+	-	-	-	-	-	-	*	-	-	+	*	-	-
Sphaerosyllis sp.	+	-	-	-	-	-	+	+	-	-	-	+	-	*	-	-	-	-	-	-	-	-	-	-	+	-	-
Spiophanes bombyx	+	-	-	-	+	-	-	-	-	*	-	-	-	+	-	-	-	-	*	-	+	-	-	-	-	-	-
Spiophanes missionensis	+	-	-	-	-	-	+	-	-	+	+	+	-	-	-	-	-	-	-	*	*	-	*	*	*	-	-
syllids, various	*	-	*	-	+	-	+	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Thalenessa spinosa	+	*	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Tharyx marioni	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eumida spp.	.	*	-	+	*	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	+	+
Neanthes brandti	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nereis procera	.	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	+	+	-	+	+	+	-	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Notomastus tenuis	.	+	-	-	-	-	-	-	-	-	+	+	-	-	-	-	+	-	-	+	-	*	*	+	-	-	-
Pista disjuncta	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polydora caulleryi	.	*	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telepsavus costarum	.	+	+	+	+	*	+	-	-	+	-	+	*	+	-	-	+	*	-	*	-	-	+	-	+	-	-
Tharyx spp.	.	*	-	-	-	-	-	-	-	-	*	-	+	-	-	+	-	-	*	-	-	-	*	-	-	-	-
Anaitides madeirensis	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-
Aricidea lopezi	.	.	*	-	-	-	-	-	-	+	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-
Aricidea neosuecica	.	.	+	-	-	-	+	-	-	+	-	+	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-
Aricidea uschakowi	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	
Boccardia uncata	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capitomastus sp.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-
Caulleriella alata	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaetozone setosa	.	.	*	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chone mollis	.	.	+	-	-	-	+	-	-	+	-	*	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Chrysopetalum occidentale	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirratulus cirratus	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Cirrophorus furcatus	.	.	+	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drilonereis nuda	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-
Eulalia quadrioculata	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Exogone spp.	.	.	+	-	-	-	-	-	-	-	-	-	*	-	+	+	-	+	-	-	+	-	-	-	-	-	-
Gyptis brunnea	.	.	+	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heteromastus filiformis	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laonice cirrata	.	.	+	-	-	-	+	-	-	+	-	+	-	+	-	-	-	-	-	-	*	-	-	+	+	-	-
Lumbrineris cruzensis	.	.	*	-	-	-	+	-	-	+	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-
Nereis p. neonigripes	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odontosyllis phosphorea	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pectinaria californiensis	.	.	+	-	-	-	-	-	+	-	+	+	-	-	-	+	-	+	+	+	*	-	-	+	+	*	+
Pherusa capulata	.	.	+	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	+	+	-	+	-	-	-	-	-
Pholoe glabra	.	.	+	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	+	+	*	+	-	+	*	-	-
Phyllochaetopterus prolifica	.	.	*	+	-	-	+	-	-	+	+	-	-	*	+	-	-	+	-	-	-	-	*	-	-	-	-
Pilargis ?hamatus	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praxillella a. pacifica	.	.	+	-	-	-	+	-	-	+	-	-	-	+	-	-	-	-	-	+	-	-	-	-	+	-	-
Prionospio pinnata	.	.	+	-	-	-	*	-	+	+	-	+	-	+	-	+	-	-	+	-	*	+	-	+	*	-	+
Schistocomus hiltoni	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Sphaerosyllis californiensis	.	.	*	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sthenelanella uniformis	.	.	+	-	-	-	+	-	+	+	-	-	-	-	-	-	-	-	-	+	+	-	+	-	-	-	-
Tharyx tesselata	.	.	*	+	-	-	*	-	-	+	-	-	-	*	-	-	*	-	-	-	*	*	-	+	*	-	-
Typosyllis sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Ampharete arctica	.	.	.	*	-	-	+	+	-	-	*	+	-	-	+	*	+	-	-	+	+	-	+	-	+	-	-
Boccardia basilaria	.	.	.	+	-	-	-	-	-	+	+	+	-	+	-	-	*	-	*	*	-	*	-	-	-	-	-
Chaetozone gracilis	.	.	.	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-
Cistenides brevicoma	.	.	.	+	-	-	-	+	+	+	-	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
Eumida spp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	*	-	-	-	-	-	-	+	-
Loimia montagui	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panthalis pacifica	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poecilochaetus johnsoni	.	.	.	+	-	-	+	-	+	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Tharyx multifilis	.	.	.	*	-	*	-	-	+	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-
Anaitides spp.	.	.	.	.	+	+	+	-	-	-	+	+	+	+	+	-	-	-	-	-	+	-	+	-	-	-	-
Armandia bioculata	.	.	.	.	+	-	-	-	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
cirratulids	.	.	.	.	*	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Euchone sp.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-
Glycera spp.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hesionids	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris nr. acuta	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Marphysa mortenseni	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pareurythoe californica	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
phyllodocids	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Pisione remota	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prionospio cirrifera	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Protodorvillea gracilis	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thoracophelia sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyllochaetopterus limicolus or P. sp.	.	.	.	.	.	+	-	+	-	-	-	+	-	-	-	-	*	+	+	-	-	+	-	-	-	-	-
Spiophanes missionensis	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Axiothella rubrocincta or A. sp.	.	.	.	.	.	.	+	-	-	+	-	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-
capitellids	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	+	*	-	-	-	-	-	-	-
Chaetozone corona	.	.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-
Cossura candida	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	+	-	*	+	*	+	*	+	+	+	-	-
Drilonereis spp.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	+	+	-	+	-	-	-	+	-	+	-	-
Eunice antennata	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glycera americana	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Goniada brunnea	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	+	-	-
Haplosyllis sp.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidonotus caelorus	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris californiensis	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magelona sp.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Owenia f. collaris	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Paraonis gracilis	.	.	.	.	.	.	*	-	-	*	-	-	-	+	+	-	-	+	+	*	*	-	-	+	+	+	-
Peisidice aspera	.	.	.	.	.	.	+	+	-	*	-	*	+	*	+	+	-	+	-	+	-	-	+	-	-	-	-
Pherusa inflata	.	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Pista disjuncta	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	*
Pseudopotamilla occelata	.	.	.	.	.	.	+	-	-	-	+	+	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-
Rhodine bitorquata	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-
Sabellaria cementarium	.	.	.	.	.	.	+	-	-	-	-	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
Scalibregma inflatum	.	.	.	.	.	.	*	-	+	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-
Syllis ?gracilis	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thormora ?johnstoni	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trypanosyllis gemmipara	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dodecaceria sp.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myxicola infundibulum	.	.	.	.	.	.	.	*	-	+	+	+	+	+	+	-	+	-	-	-	-	-	-	-	-	-	-
Odontosyllis sp.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pherusa spp.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-
spirorbids	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
terebellids	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aphrodita sp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-
Cirriformia spirabrancha	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Dasybranchus sp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diopatra tridentata	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
EXOGONINAE	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Halosydna sp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Streblosoma crassibranchia	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ampharete sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Autolytus sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Brada pilosa or B. sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	+	-	-	+	+	+	-	-	-	-	-	-
Eumida, trilineate	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	*	-	+	+	-	-	-	-	-
Exogone uniformis	.	.	.	.	.	.	.	.	.	*	-	+	-	*	-	-	-	-	-	-	-	-	-	-	+	-	-
Exogonella brunnea	.	.	.	.	.	.	.	.	.	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Loandalia fauveli or L. sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	+	-	-	-	-	-	-	+	-	-	-	-
Mediomastus californiensis	.	.	.	.	.	.	.	.	.	*	-	+	+	*	-	-	-	-	-	*	-	+	-	-	+	-	-
Megalomma sp.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-
Melinna denticulata	.	.	.	.	.	.	.	.	.	*	+	*	-	+	-	-	-	-	+	+	+	+	+	-	+	+	+
Pista cf. cristata	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polydora ?socialis	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tharyx monilaris	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	*	-	-	+	*	+	-	+	+	-	-
Chloeia pinnata	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	+	+	*	*	*	*	*	+	+	-	*

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Lumbrineris latreilli	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magelona pacifica	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panthalis pacifica	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Brada pluribranchiata	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capitita ambiseta	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eumida bioculata	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-
Pista alata	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melinna sp.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Naineris uncinata	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pherusa inflata	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pista spp.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potamilla sp.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-
Ampharete labrops	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	*	-	-	-	-	-	-	-	-
Anaitides medipapillata	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caulleriella bioculata	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	+	-	+	+	-	-	-	-	-
Distylidia rugosa	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eulalia, cross-barred or E. sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	+	+	-	-	-	-	-	-	-
Pista elongata	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiophanes fimbriata	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Eulalia ?myriacyclum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	+	–	–
Nereis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–	–	–	–	–	–	–
Prionospio spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	*	–	–
Pseudopotamilla, oculate	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–
Halosydna sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–
Lepidasthenia sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–
Notomastus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	+	–	+	–	–	–	–	–	–
Pilargis berkeleyi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	+	–	–	–	–	–	–
Raricirrus maculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	–	+	–	+	–	–	–	–	–
Aricidea spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Asabellides sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Boccardia spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Eunice americana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	–	–	–	+	+	+
?Fabricia sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Harmothoe lunulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
hesionid, purple	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Lanice conchilega or L. sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	–	–	–	–	–	–
Marphysa disjuncta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	–	–	–	–	+	–
Onuphis parva	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	*	+	–	+	+	+	–	–

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Polycirrus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-
Sabella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Sphaerodoridium minutum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Amage anops	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	+	-	-
arabellid, parasitic	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Chone ecaudata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-
Dasybranchus glabrus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Lumbrineris minima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Lumbrineris tetraura	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Lysippe annectens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	-	-
Myriowenia californiensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Polydora limicola	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-
Sphaerodorum sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Spiophanes fimbriata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	*	-	*	+	-	-
Sternaspis fossor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	+	-	-
Amphicteis scaphobranchiata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-
Ancistrosyllis tentaculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	-
Aphrodita refulgida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-
Artacamella hancocki	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Asychis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Ceratocephala c. americana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Drilonereis longa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–
Eteone californica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–
Hesperonoe laevis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Heterospio catalinensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Lepidasthenia virens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Lumbrineris bicirrata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	–	–	+	+
Lumbrineris inflata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Lysilla annectens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Magelona pacifica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Maldane sarsi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Megalomma splendida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	+	–	*
Myriochele gracilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Nephtys ferruginea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	+	–	–	–
nerinid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–
Ninoe gemmea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Nothria elegans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Pherusa sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Pista elongata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Praxillella gracilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Spio punctata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Sthenelais tertiaglabra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-
Terebellides stroemii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Travisia gigas	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	-
Brada pluribranchiata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	+
Capitellides sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-
Lumbrineris cf. bassi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Notocirrus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Glycera ?capitata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-
Harmothoe scriptoria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-
Amaeana occidentalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Antinoella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Asychis disparidentata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Cirrophorus aciculatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Langerhansia heterochaeta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
maldanids, various kinds	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Nothria spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-

Polychaeta in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Notomastus lineatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–
onuphids, various kinds	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–
Travisia pupa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+
Euclymene reticulata or E. sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–
pilargid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–
Spiophanes sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–
Nothria pallida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*

Echinodermata in the Palos Verdes shelf and slope, showing order of occurrence in 7 to 195 fms.

Dendraster excentricus or D. sp.	*	*	–	+	+	–	–	–	–	–	+	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–
Amphipholis squamata	.	.	+	–	–	–	–	–	–	–	–	–	–	–	+	+	–	–	–	–	–	–	–	–	–	+	*
Lytechinus anamesus	.	.	+	+	+	–	–	–	–	+	–	+	–	–	+	+	–	–	–	–	–	–	–	–	–	–	–
Strongylocentrotus purpuratus	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphiodia urtica	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	*
Amphipholis pugetana	.	.	.	.	.	.	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Leptosynapta albicans or L. sp.	.	.	.	.	.	.	+	–	–	–	–	+	+	+	+	–	–	–	–	–	+	–	–	–	–	+	+
Ophiothrix spiculata	.	.	.	.	.	.	*	*	–	–	–	*	+	–	+	*	–	–	–	–	–	–	–	–	–	–	–
Asterina miniata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–
Astropecten californicus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–

Echinodermata in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Luidia ludwigi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Pisaster capitatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Sclerasterias heteropaes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-
Ophiura lutkeni	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Ophiuroconis bispinosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Molpadia intermedia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-
Amphioplus strongyloplax	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	+
Amphiura arcystata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Pentamera pseudopopulifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
ophiuroids	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-
Amphiacantha amphacantha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-
Amphiodia digitata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-
Brisaster townsendi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Brissopsis pacifica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-
holothurians	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-

Mollusca in the Palos Verdes shelf and slope, showing order of occurrence in 7 to 195 fms.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Acteon punctocoelata	+	-	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	+	+	-	+	-	+	-	-	-	-
Lima dehiscens	+	-	*	*	-	*	+	-	+	*	*	*	*	-	+	-	*	-	+	+	-	-	-	-	-	-	-
Macoma yoldiformis	+	-	-	-	-	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
?Plagioctenium circularis	+	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
solenogasters	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	+	-	+	-
Trachycardium quadragenarium	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Calliostoma sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conus californicus	.	+	+	-	-	-	+	-	-	*	-	*	*	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Nassarius sp.	.	+	-	-	-	-	-	-	-	*	-	-	*	+	-	-	-	-	-	-	-	-	-	-	-	-	-
?Pecten sp.	.	+	-	-	-	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Polinices sp.	.	+	-	+	-	+	-	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellina sp.	.	+	-	*	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-
Asthenothaerus villosior	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamys sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Glans carpenteri	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
?Kellia sp.	.	.	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Lucinisca nuttalli	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Macoma sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Mangelia sp.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-

Mollusca in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Modiolus sp.	.	.	+	-	-	-	-	-	+	+	-	-	-	-	+	-	-	+	-	+	-	-	-	-	-	-	-
Mytilus sp.	.	.	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nassarius perpinguis	.	.	+	-	-	+	+	-	-	-	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Nitidella carinata	.	.	*	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitidella ?tuberosa	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odostomia sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-
Parvilucina tenuisculpta	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	-	+	-	-	-	-
Rochefortia aleutica or R. sp.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	+	-	-	+	-	-	-	-	-	-
Saxicava arctica	.	.	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
?Tapes sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellina carpenteri	.	.	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Protothaca staminea	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crystallophrisson spp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphissa cf. reticulata	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sinum ?scopulosum	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bittium sp.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Burchia redondoensis	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
chitons	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepipatella lingulata	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mollusca in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Diadora aspera	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
?Fusinus sp.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Kellia laperousi	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lithophaga p. kelseyi	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
?Sphenia sp.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Turbonilla sp.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
keyhole limpets	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Neosimnia acicularis	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
vermetid	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Zonaria sp.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cyathodonta pedroana	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Leda sp.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Olivella baetica	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Yoldia scissurata	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aglaja sp.	.	.	.	.	.	.	.	.	.	+	–	–	+	+	–	–	+	–	–	–	+	+	–	–	–	–	–
Callistoma ?tricolor	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Crepidula spp.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–
Epitonium sp.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
?Chione sp.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Mollusca in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Saxicava arctica	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellina modesta	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aglaja purpurea	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepidula nivea	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepidula onyx	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepidula spp.	.	.	.	.	.	.	.	.	.	.	.	+	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nassarius mendicus	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiodermella incisa	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polinices cf. draconis	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sinum debile	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
slugs	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Modiolus sacculifer	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Periploma planiuscula	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pododesmus macroschismus	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphissa sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Solen sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Modiolus modiolus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Solemya sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Thyasira sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-

Mollusca in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Cadulus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	+	–	–	–	–	–	–
Cylichna ?attonsa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
?Nitidella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
?Saxicavella pacifica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
?Vitrinella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
Amygdalum pallidulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Axinopsida serricata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	+	–	–	–
Lucinoma annulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–	–	–
Lyonsia californica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Solamen columbianum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	–	–	–	–	–	–
Thyasira trisinuata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–	–	–
Cancellaria sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–	–
Admete sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Adontorhina cyclia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Amphissa undata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Balcis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Cylichna diegensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–
Lima subauriculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Nuculana hamata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–

Mollusca in Palos Verdes shelf and slope (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Pandora bilirata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Thracia curta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Thracia, other sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Compsomyax subdiaphana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-
Dentalium rectius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-
Nucula carlottensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-
Volvulella tenuissima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-
Cardiomya sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Cardita ventricosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Pseudopythina sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Volvulella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-

SAN PEDRO SHELF

The San Pedro (SP) shelf, in depths to 50 fms, supports a diversified and complex fauna, changing from one location to the next, according to kinds of sediments, location, and other physical factors. Some shallowest depths, off Seal Beach, characterized as reddish brown beach-sand, have a unique association of animals; similar deeper sands, in 17 fms, have different kinds and numbers of animals. Vertical zonation is similarly demonstrable in gray to black silts, in hard-packed sands, and in rocky or mixed sediments—all of which are represented in the San Pedro area. Changes of specific units with depths, kinds of sediments and other factors, are indicated on the charts of species; they show not only ecological groups of species, but vertical zonation, and relative abundance of the more numerous kinds. Proportionately few species occur in all depths, from shallowest to greatest; most are limited to one or few stations; some other species show replication by association with other biological units.

The charts demonstrate further the repeated occurrence of species within genera; in polychaete genera it is shown for species of *Lumbrineris*, *Pherusa*, *Prionospio*, *Glycera*, *Spiophanes*, and others. These occurrences may be more than incidental, for it can be assumed that the "rain of larvae" is present over all; their settlement and growth may be restricted by factors concerned with peculiarities of larval or planktonic adaptability.

Another process of some interest is the frequent recurrence of non-reproductive individuals, especially in outer, slope areas; here shelf-species are present but do not attain maturity; they show the same patterns of distribution and growth as do those below sill depths of offshore basins.

The changes of species with depth, kinds of sediments, faunal composition, and ecological associations are shown for the polychaetes, echinoderms and mollusks, in the charts below. The amphipods, which were equally numerous in some samples, and other crustaceans are omitted from the tabulations because they have been incompletely named, although more than 200 species have been named or identified in reports by Dr. J. L. Barnard (1959-1963) and many identified collections are consultable in the collection of the Allan Hancock Foundation.

A comparison of numbers of species and specimens, in depths of 6.5 to 48 fms, shows no decline or rise with depth of bottom, except in rocky areas, where numbers appear lower; this is due, in part, to the ineffective sampling methods, for when samples are hand-picked, as by diving, the numbers rise remarkably. The values of specific diversity, on the San Pedro shelf, by increasing depth, are illustrated:

Sta. no.	Depth in fms.	Size of sample in cuft	No. of species	No. of specimens
4885	6.5	1.89	85	800
5740	8	0.06	66	529
2504	9	0.13	41	115
3047	10	—	63	170
5753	10	0.13	64	320
4886	10.5	1.44	94	1097
6102	12.5	0.63	92	574
2107	13	2.0	68	316
4719	13	0.44	76	266
6100	13.5	0.78	80	433
5752	14.5	0.06	75+	494
6104	14.5	0.37	115	945
5741	15	0.31	101	899
5844	15	0.06	48	239
5754	16	0.88	72	716
5751	16.5	0.31	65	666
5742	17	0.44	63	358
5743	19	0.44	127	1412
5820	24.5	0.18	102	734
5750	25.5	0.13	67	376
5087	27	0.56	98	522
5003	30	0.18	78	527
5086	38	0.37	79	1402
5748	38	0.25	108	1347
2355	41	0.10	32+	240
5749	42	0.13	87	924
2630	45	0.86	42	689
5745	46	0.44	82+	1401
2126	48	—	64+	239+

The following samples (1 to 35) from the San Pedro shelf, come from depths of 5 to 48 fms. Polychaetes, echinoderms and mollusks are listed on the chart (immediately following); others are summarized in the

Analyses. Some of the crustaceans are more completely named in the State report (California, 1965, App. pp. 104-301).

1. Sta. 2741 (no. 50). Off Seal Beach, in 5 fms. Campbell grab took 2.15 cuft of red-brown beach sand with broken shells. The fauna was a limited one, comprising chiefly three species of polychaetes (see chart), two echinoderms, and two mollusks, each in considerable numbers.

2. Sta. 4885 (no. 49). 2 mi from east end of Long Beach breakwater, in 6.5 fms. OPG took 1.89 cuft of red sand over grayish black silt. In addition to the species listed on the chart, there were a small anemone, a polyclad (3), nemerteans (21), a phoronid (1), *Glottidia albida* (1), 11 kinds of amphipods (26), two cumaceans (5), three ostracods (6), a pinnixid crab (3), a shrimp (1), a pycnogonid (7), *Branchiostoma* sp. (22), and an enteropneust (3). Largest species was *Solen sicarius*, and most conspicuous *Branchiostoma*. Most numerous species were *Mediomastus californiensis* (125), *Tharyx tesselata* (113), *Prionospio pinnata* (61), and *Amphipholis squamata* (52).

Numbers of species and specimens totalled:

polychaetes	45 species,	619 specimens
echinoderms	4	64
mollusks	7	9
crustaceans	20	44
others	9	64
Total:	85 species,	800 specimens

3. Sta. 5740 (no. 68). 9.75 mi from Los Angeles harbor light, in 8 fms. OPG took 0.06 cuft of fine gray sand. In addition to those named in the chart, the sparse sample yielded a small coelenterate, two nemerteans (9), bryozoans, eight amphipods (33), two cumaceans (9), a *Callianassa* sp. (4), and a crab (2). Largest species were *Terebra pedroana* and *Ophiodermella incisa*; most abundant were *Chaetozone corona* (65), *Tharyx tesselata* (51), *Prionospio malmgreni* (46) and *P. pinnata* (42), and *Olivella baetica* (31).

Numbers of species and specimens totalled:

polychaetes	37 species,	382 specimens
echinoderms	2	8
mollusks	13	67
crustaceans	13	50
others	3	22+
Total:	68 species,	529+ specimens

4. Sta. 2504 (no. 67). Off Los Angeles light, in 9 fms. OPG took 0.13 cuft of black sandy mud and gray sand and broken shells. In addition to those named on the chart, there were nemerteans (2), amphipods (15), a tanaid (1), cumaceans (3) and ostracods (6). All were small, none was abundant, with *Tellina buttoni* (17) the best represented.

Numbers of species and specimens totalled:

polychaetes	28 species,	61 specimens
echinoderms	1	2
mollusks	5	21
crustaceans	4+	25
others	3	6
Total:	41+ species,	115 specimens

5. Sta. 3047 (near no. 45). 1.1 mi east of Los Angeles light, in 10 fms. OPG took a small mud sample with many animals. Small anemones and a large enteropneust accompanied the specimens listed on the chart. None was abundant.

Numbers of species and specimens totalled:

polychaetes	ca. 50 species,	100+ specimens
echinoderms	2	5
mollusks	3	5
Total:	ca. 55 species,	110+ specimens

6. Sta. 5753 (near no. 45). 2.45 mi from Los Angeles harbor light, in 10 fms. OPG took 0.13 cuft of fine gray sand. In addition to those listed on the chart, there were two nemerteans (14), five amphipods (23), five cumaceans (14), an isopod (1) and a tanaid (3). The largest species was *Terebra pedroana*, the most abundant *Prionospio malmgreni* (36), *Mediomastus californiensis* (35) and *Tellina carpenteri* (18). Echinoderms were absent.

Numbers of species and specimens totalled:

polychaetes	34 species,	217 specimens
mollusks	12	44
crustaceans	14	41
others	4	18
Total:	64 species,	320 specimens

7. Sta. 3048 (near no. 45). 1.25 mi east of Los Angeles light, in 10.5 fms. OPG took a small mud sample with animals. Coelenterates, with a ceriantharian, a broad-pannicled sea-pen and branching hydroids, several nemerteans, a phoronid, a *Glottidia albida*, and a few amphipods,

caprellids, an ostracod, a spider crab and an enteropneust, *?Schizocardium* (2) were present, in addition to those listed on the chart. The largest individuals were the sea-pen and the enteropneust. Most abundant species were *Nothria iridescens* and *Phyllochaetopterus prolifica*. Numbers of species is estimated at 58+, and specimens at more than 200.

8. Sta. 4886 (near no. 48). 0.85 mi east of Long Beach, near breakwater, in 10.5 fms. OPG took 1.44 cuft of gray to black, medium to coarse sand. Coelenterates were represented by *?Harenactis* (23) and a sea-whip; one nemertean (32), 11 amphipods (35), two isopods (2), three cumaceans (26), three ostracods (4), *Callianassa* sp. (1), two pinnotherid crabs (19), two pycnogonids (8), and an enteropneust (7). The largest animal was *Amphiodia occidentalis*, and the most conspicuous were *Tharyx tesselata* (300+), *Scalibregma inflatum* (61), *Mediomastus californiensis* (45), *Amphipholis squamata* (41), and *Brada pilosa* (34).

Numbers of species and specimens totalled:

polychaetes	49 species,	836 specimens
echinoderms	3	69
mollusks	9	16
crustaceans	23	92
others	11	84+
Totals:	95 species,	1097+ specimens

9. Sta. 3053 (near no. 47). 3.5 mi off Los Angeles light, in 11-12 fms. Biological dredge, in rocky and rubbly bottom, took a diversified fauna, with a large pagurid, echinoderms, fishes, and many other animals. Coelenterates were present with gorgonian corals, *Euplexaura marki*, coarse brown *Eunicea*, *Ptilosarcus quadrangularis* (broad-pannicled sea-pen) and *Corynactis californica*. Bryozoans were encrusted on rocks, and crustaceans included many amphipods, caprellids, and barnacle clumps. The largest individuals were *Holopagurus pilosus*, and *Astropecten* sp. Number of species was estimated at more than 57.

10. Sta. 2311 (no. 66). Off Long Beach breakwater light, in 12 fms. OPG took 0.5 cuft, in 2 drops. In addition to the species named (Hartman, 1955, p. 76) additional species are indicated in the chart. Total number of species is well over 100.

11. Sta. 6102 (near no. 47). Off Long Beach breakwater, in 12.5 fms. OPG took 0.63 cuft of dark gray fine sand. A polyclad (1), a small nemertean (28), six amphipods (18), four cumaceans (8), two ostracods (10), a mysid (1), and a pinnixid (1), accompanied the spe-

cies named on the chart. All species were moderately small; most abundant were *Prionospio pinnata* (47), *Chaetozone corona* (33), *Tellina carpenteri* (32).

Numbers of species and specimens totalled:

polychaetes	50 species,	373 specimens
echinoderms	3	15
mollusks	17	41
others	5	41
Total:	75 species,	470 specimens

12. Sta. 2107 (no. 46). 2.2 mi off Los Angeles light, in 13 fms. OPG took 2.0 cuft of sand and mud with many animals. Present were a sea-whip (2), a small anemone, a sipunculid (8), an echiuroid, *Listriolobus pelodes* (2), a phoronid (3), *Glottidia albida* (2), an amphipod (1), a caprellid (3), a cumacean (1), an ostracod (1), a brachyuran crab (1), and an enteropneust (1). Largest animal was *Tagelus californicus* (6) measuring to 80 mm long, and most abundant species were *Nereis procera* and *Sthenelanella uniformis*, each with 31, and *Cossura candida* with 20.

Numbers of species and specimens totalled:

polychaetes	38 species,	256+ specimens
echinoderms	2	15
mollusks	5	17
crustaceans	5	7
others	8	21
Total:	58 species,	316+ specimens

13. Sta. 4719 (near no. 48). East end of Long Beach breakwater, in 13 fms. OPG took 0.44 cuft of gray and green sand, with many animals. ?*Harenactis* sp. (4) and a nemertean (3), *Glottidia albida* (2), seven amphipods (19), two isopods (2), a tanaid, two ostracods (8), and a cumacean (1) accompanied the species named on the chart. Largest species were *Nephtys caecoides* and *Nothria elegans*, and most abundant was *Scalibregma inflatum* (26).

Numbers of species and specimens totalled:

polychaetes	37 species,	175 specimens
echinoderms	5	9
mollusks	14	38
others	3	9
Total:	59 species,	231 specimens

14. Sta. 6100 (near no. 46). 5.65 mi from Pt. Fermin light, in 13.5 fms. OPG took 0.78 cuft of dark gray medium to fine sand. Small nemerteans (14), 11 amphipods (85), a caprellid (1), four isopods (6), a tanaid (2), three cumaceans (26), five ostracods (56), *Heterocrypta occidentalis* (2), a pinnixid (1), and an enteropneust (1), accompanied those named on the chart. The largest individual was *Lovenia cordiformis*. No species was outstandingly abundant.

Numbers of species and specimens totalled:

polychaetes	37 species,	180 specimens
echinoderms	4	23
mollusks	7	35
crustaceans	29	180
others	3	15
Total:	80 species,	433 specimens

15. Sta. 2006 (near no. 47). 2.5 mi south of Long Beach, in 14 fms. The trawl took ascidian clumps, chiefly *Styela* and *Amaroecium* colonies. A polyclad and a pycnogonid accompanied the polychaetes named on the chart.

16. Sta. 5752 (near no. 64). 5 mi from Los Angeles light, in 14.5 fms. OPG took 0.06 cuft of fine gray sand with many small animals, chiefly polychaetes, together with a ceriantharian, a small nemertean (7), *Glottidia albida* (5), eight amphipods (21), two isopods (5), tanaids (5), three cumaceans (5), two crabs (3). Largest species were *Glottidia albida*, a ceriantharian and *Amphipholis squamata*; most numerous were *Prionospio pinnata* (64), *Mediomastus californiensis* (56), *Prionospio malmgreni* (39), and *Tellina buttoni* (31).

Numbers of species and specimens totalled:

polychaetes	37 species,	322 specimens
echinoderms	3	8
mollusks	16	100
crustaceans	16	50
others	4	14
Total:	76 species,	494 specimens

17. Sta. 6104 (near no. 65). Nearly 10 mi from Pt. Fermin light, in 14.5 fms. OPG took 0.37 cuft of dark gray silty fine sand. A sea-whip,

a polyclad (1), a nemertean (4), a sipunculid (2), 11 amphipods (35), a caprellid (1), an isopod (9), five cumaceans (6), an epinebalian (3), and a kelp crab (2), accompanied the species named on the chart. Largest species were *Astropecten californicus* and *Glycera robusta*; most abundant were *Amphiodia urtica* (56), *Aricidea lopezi* (56), and *Chone* sp. (48).

Numbers of species and specimens totalled:

polychaetes	59 species,	567 specimens
echinoderms	6	121
mollusks	24	135
crustaceans	20	56
others	6+	66
Total:	115+ species,	945 specimens

18. Sta. 5741 (no. 67). 9.25 mi from Los Angeles light, in 15 fms. OPG took 0.31 cuft of fine gray sand with many small animals. Weight of animals was estimated at 19.2 grams, of which polychaetes comprised 9.3, ophiuroids 7.1, and mollusks 2.5 grams. In addition to those listed on the chart, there were present a small nemertean (9), a phoronid (1), *Glottidia albida* (131 juveniles), nine amphipods (43), a tanaid (7), two ostracods (29), three cumaceans (5), *Callianassa* sp. (1), and a pinnixid (5). The largest individual was *Astropecten californicus*, the most conspicuous species *Amphioplus hexacanthus* (88), and the most abundant *Glottidia albida* (131) and *Chaetozone corona* (88+).

Numbers of species and specimens totalled:

polychaetes	49 species,	464 specimens
echinoderms	4	99
mollusks	24	102
crustaceans	21	93
others	3	141
Total:	101 species,	899 specimens

19. Sta. 5844 (no. 64). 2.6 mi from Los Angeles harbor light, in 15 fms. OPG took 0.06 cuft of coarse red sand and a few rocks. In addition to those shown on the chart, this very small sample took two anemones (4), a nemertean (4), a sipunculid (2), an oligochaete (12), five amphipods (29), an isopod (3), and a cumacean (1).

Numbers of species and specimens totalled:

polychaetes	28 species,	159 specimens
echinoderms	2	11
mollusks	4	7
crustaceans	8	36
others	5	22
Total:	47 species,	235 specimens

20. Sta. 5754 (near no. 62). 1.65 mi from Los Angeles light, in 16 fms. OPG took 0.88 cuft of coarse dark gray to black sand, with woody debris and many animals. Wet weights totalled 43.4 grams, of which polychaetes were 13, echinoids 10.4, mollusks 9.2, holothuroids 4.6, anemones 3.0, nemerteans 2.9 grams, and others less than 1.0 gram. In addition to those listed on the chart, the lot contained a ceriantharian (1), a sand-covered anemone (12), *?Harenactis* (1), three nemerteans (35), *Glottidia albida* (4), seven amphipods (12), two isopods (4), two ostracods (8), three cumaceans (23), *Callianassa* (1) and *Heterocrypta* (1). Largest individuals were *Lytechinus anamesus* (12), and *Pentamera pseudopopulifera* (2); most conspicuous or numerous species were *Pherusa capulata* (10), *Tharyx tesselata* (275), *Lysippe annectens* (15) and *Prionospio pinnata* (20).

Numbers of species and specimens totalled:

polychaetes	42 species,	585 specimens
echinoderms	2	14
mollusks	5	14
crustaceans	16	49
others	7	54
Total:	72 species,	716 specimens

21. Sta. 5751 (near no. 63). 4.8 mi from Los Angeles light, in 16.5 fms. OPG took 0.31 cuft of gray sand with animals. In addition to those listed on the chart, there were a ceriantharian (1), a polyclad (1), two nemerteans (4), *Glottidia albida* (12), four amphipods (26), a tanaid (4), cumaceans (4), ostracods (21), and *Heterocrypta occidentalis* (1). Largest individual was *Astropecten californicus* (2), and most conspicuous *Ophiothrix spiculata* (144); high counts occurred also in *Aricidea lopezi* (96), *Prionospio malmgreni* (62), *Onuphis nebulosa* (52) and *Melinna denticulata* (45).

Numbers of species and specimens totalled:

polychaetes	42 species,	416 specimens
echinoderms	5	166
mollusks	4	9
crustaceans	8	56
others	6	19
Total:	65 species,	666 specimens

22. Sta. 3052 (near no. 63). 4.4 mi off Los Angeles light, in 16.5 to 17 fms. The biological dredge took rocks overgrown with organisms, especially sponges, *Corynactis* (in crevices on rocks), branching hydroids, encrusting and branching bryozoans, and tubicolous amphipods. Echinoderms and mollusks were most conspicuous; smaller animals had perhaps been lost in recovery of the sample.

23. Sta. 5742 (near no. 86). 11.7 mi from Los Angeles light, in 17 fms. OPG took 0.44 cuft of reddish brown sand with many animals. In addition to those listed on the chart, the sample contained a rhabdocoele (2), a sipunculid (1), *Glottidia albida* (5), a phoronid (6), seven amphipods (46), an isopod (5), an ostracod (5), and two cumaceans (5). Largest individuals were *Lovenia cordiformis*, *Nephtys californiensis* and *Onuphis eremita*. Most abundant were *Lumbrineris cruzensis* (33), *Spiophanes bombyx* (27), and *Dendraster excentricus* and *Lumbrineris* cf. *acuta*, each with 19 individuals.

Numbers of species and specimens totalled:

polychaetes	32 species,	216 specimens
echinoderms	7	28
mollusks	8	32
crustaceans	12	68
others	4	14
Total:	63 species,	358 specimens

24. Sta. 5743 (near no. 83). 7.2 mi from Los Angeles light, in 19 fms. OPG took 0.44 cuft of fine green sand with many small animals. Gross weight was only 17.4 grams, of which polychaetes were 10.1 and ophiuroids 5.5 grams. A polyclad (1), a nemertean (25), *Glottidia albida* (151), 13 kinds of amphipods (172), three isopods (12), two tanaids (21), five ostracods (151), five cumaceans (23), *Heterocrypta* (1), another crab (1), and *Scalpellum* (6) accompanied the species named on the chart. Largest animals were *Polinices lewisii*, *Lumbrineris californiensis* and *Nephtys californiensis*. Most abundant or conspicuous were *Amphioplus hexacanthus* (39), *Onuphis nebulosa* (15), *Prionospio*

pinnata (168), and *Glottidia albida* (151). Others attaining peak numbers were *Axiothella rubrocincta* (32), *Aricidea lopezi* (52), *Mediomastus californiensis* (47), and *Sthenelanella uniformis* (38).

Numbers of species and specimens totalled:

polychaetes	60	species,	658	specimens
echinoderms	7		72	
mollusks	25		110	
crustaceans	32		395	
others	3		177	
Total:	127	species,	1412	specimens

25. Sta. 5820 (near no. 101). 7.2 mi from Los Angeles light, in 24.5 fms. OPG took 0.18 cuft of fine olive-green sand with many animals. A ceriantharian (29), ?*Harenactis* (2), a nemertean (4), *Glottidia albida* (42), a phoronid (6), 13 amphipods (86), a caprellid (1), two isopods (2), tanaids (22), cumaceans (54) and *Heterocrypta* (1) accompanied the species named on the chart. Largest animal was *Ophiura lutkeni*; most abundant species were *Spiophanes missionensis* (47), *Aricidea lopezi* (42), and *Prionospio pinnata* (28).

Numbers of species and specimens totalled:

polychaetes	44	species,	360	specimens
echinoderms	5		35	
mollusks	21		56	
crustaceans	26		194	
others	6		89	
Total:	102	species,	734	specimens

26. Sta. 5750 (near no. 100). 5.5 mi from Los Angeles light, in 25.5 fms. OPG took 0.13 cuft of fine green sand, with many animals. A ceriantharian (3), *Glottidia albida* (12), six amphipods (42), caprellid (1), two isopods (4), two tanaids (39), and four cumaceans (11) accompanied the species named in the chart. Largest individual was *Nephtys caecoides*; most conspicuous were *Amphiodia urtica* (17), *Amphioplus hexacanthus* (14), and *Chlocia pinnata* (3).

Numbers of species and specimens totalled:

polychaetes	30	species,	192	specimens
echinoderms	4		33	
mollusks	15		40	
crustaceans	15		95	
others	3		16	
Total:	67	species,	376	specimens

27. Sta. 5087 (near no. 108). 3.6 mi from Newport pier, in 27 fms. OPG took 0.56 cuft of dark green sandy silt with many animals. Wet weight totalled 65.3 grams, with ophiuroids 40, polychaetes 10, crustaceans 7, gorgonian 4.6, and others less than 1.0 gram. A gorgonian, a ceriantharian, a nemertean (5), a sipunculid, small *Listriolobus pelodes* (3), a papillated leech (1), *Glottidia albida* (1), 16 amphipods (69), a caprellid (4), a tanaid (2), a cumacean (2), an ostracod (2), an epinebalian (4), *Scalpellum* (14), *Heterocrypta occidentalis* (1), a shrimp (2), a pycnogonid (1), an enteropneust (1) and *Pyrosoma* (1) were present, in addition to those listed on the chart. Largest species was *Ophiura lutkeni* (37), and most abundant *Amphiodia urtica* (119).

Numbers of species and specimens totalled:

polychaetes	35	species,	162	specimens
echinoderms	7		194	
mollusks	21		53	
crustaceans	25		97	
others	10		16	
Total:	98	species,	522	specimens

28. Sta. 5003 (near no. 108). Off Newport Bay, in 30 fms. OPG took 0.18 cuft of fine grayish green sand with many animals. Present were a loose-pannicled sea-whip (3), ?*Harenactis* (1), a nemertean (8), 12 amphipods (42), a caprellid (2), an isopod (5), a tanaid (8), three cumaceans (5), two ostracods (176). Largest individuals were a sea-whip and *Nephtys californiensis*. Most numerous animals were ostracods (176) and *Prionospio malmgreni* (36).

Numbers of species and specimens totalled:

polychaetes	33	species,	206	specimens
echinoderms	3		35	
mollusks	18		35	
crustaceans	21		239	
others	3		12	
Total:	78	species,	527	specimens

29. Sta. 5086 (no. 129). 4.7 mi from Newport pier, in 38 fms. OPG took 0.37 cuft of dark green silt and sand, with many animals. Wet weight was 12.8 grams, of which polychaetes were 5, sea-whips 4, ophiuroids 2.8, and others less than 1 gram. A sea-whip (5), a small anemone, a nemertean (2), 16 amphipods (64), an isopod (6), two tanaids (16), five cumaceans (23), five ostracods (880), and an epinebalian (2) were present, in addition to those named on the chart. The largest individuals were a sea-whip and *Nephtys caecoides*; most con-

spicuous species were *Amphiodia urtica* (56), *Chloeia pinnata* (103), followed by *Pectinaria californiensis* (19) and *Prionospio malmgreni* (43).

Numbers of species and specimens totalled:

polychaetes	26 species,	283 specimens
echinoderms	2	60
mollusks	17	57
crustaceans	30	993
others	4	9
Total:	79 species,	1402 specimens

30. Sta. 5748 (near no. 101). 8.2 mi from Los Angeles light, in 38 fms. OPG took 0.25 cuft green sand and shell, with many animals. They included a sea-whip (2), a polyclad (2), *Glottidia albida* (2), 22 amphipods (123), three isopods (18), tanaids (48), four cumaceans (37), four ostracods (425), *Scalpellum* (2), a shrimp, a pycnogonid and a colonial ascidian. Largest species were *Polinices lewisii* and *Scalpellum*, and most abundant were *Prionospio malmgreni* (106), *Amygdalum pallidulum* (90), *Chloeia pinnata* (47), *Axinopsida serricata* (40), *Chaetozone setosa* (35), *Aricidea lopezi* (32), *Lumbrineris cruzensis* (31), and *Spiophanes missionensis* (30).

Numbers of species and specimens totalled:

polychaetes	44 species,	486 specimens
echinoderms	4	41
mollusks	17	157
crustaceans	38	655
others	5	8+
Total:	108 species,	1347+ specimens

31. Sta. 2355 (no. 99). 6.3 mi off Los Angeles light, in 41 fms. OPG took 0.10 cuft of green sand with many animals. In addition to those listed on the chart, *Monobrachium* (a colony), amphipods (19), caprellids (24), an isopod (1), a tanaid (6), and two ostracods (55) were present. Largest individual was a maldanid, and most abundant was *Amphiodia urtica* (52).

Numbers of species and specimens totalled:

polychaetes	23 species,	64 specimens
echinoderms	2	60
mollusks	5	8
crustaceans	6+	107
other	1	1
Total:	37+ species,	240 specimens

32. Sta. 5749 (near no. 99). 6.4 mi from Los Angeles light, in 42 fms. OPG took 0.13 cuft of fine green sand with many animals. Wet weight of animals was estimated at 9.5 grams, with ophiuroids 5.3, polychaetes 3.4 grams, and all others 0.8 grams. In addition to those listed on the chart, 13 amphipods (47), two isopods (6), tanaids (16), two ostracods (23), a mysid (1) and *Monobrachium* colonies (61) on *Axinopsida* and *Erycina*, were present. The largest species were *Nephtys californiensis* and *Pentamera pseudopopulifera*; most abundant were *Prionospio malmgreni* (120), *Axinopsida serricata* (66), *Chloeia pinnata* (60), *Amphiodia urtica* (57), *Aricidea lopezi* (51) and *Chaetozone setosa* (42).

Numbers of species and specimens totalled:

polychaetes	40 species,	536 specimens
echinoderms	4	67
mollusks	19	117
crustaceans	23	136
others	1	68
Total:	87 species,	924 specimens

33. Sta. 2630 (no. 105). 4.4 mi SW of Huntington Beach pier, in 45 fms. Campbell grab took 0.86 cuft of sandy grayish green mud with many small animals. The following were present in addition to those named on the chart: *Monobrachium parasitum* (1), a polyclad (2), a nemertean (2), amphipods of several kinds (36), two cumaceans (3), three ostracods (9), a pinnotherid crab and a sand crab. Largest individual was *Travisia ?pupa* and most abundant *Amphiodia urtica* (390).

Numbers of species and specimens totalled:

polychaetes	26 species,	140 specimens
echinoderms	4	458
mollusks	9	27
crustaceans	9+	50
others	3	14
Total:	51+ species,	689 specimens

34. Sta. 5745 (near no. 103). 9.5 mi from Los Angeles light, in 46 fms. OPG took 0.44 cuft of fine green sand. Wet weights were estimated at 15.3 grams, of which ophiuroids comprised 12.3 and polychaetes 2.2 grams, with all others 0.8 grams. The following species were present: *?Harenactis* (1), a polyclad (1), a nemertean (12), 11 amphipods (72), three isopods (11), several tanaids (46), three cumaceans (48), and five ostracods (571), in addition to those named in the chart. Largest indi-

viduals were *Panthalis pacifica* and *Megalomma splendida*. Most conspicuous and abundant species was *Amphiodia urtica* (98), followed by *Lumbrineris cruzensis* (98), *Prionospio malmgreni* (70), *Chaetozone setosa* (65), *Aricidea lopezi* (37), and *Scoloplos armiger* (34).

Numbers of species and specimens totalled:

polychaetes	36 species,	446 specimens
echinoderms	6	127
mollusks	14	60
crustaceans	23+	754
others	3	14
Total:	82+ species,	1401 specimens

35. Sta. 2126 (no. 123). 9.2 mi from Los Angeles light, in 48 fms. OPG took a moderately large sample of coralline clumps, and many kinds of animals. In addition to those named in the chart, there were present a stalked hydroid, a nemertean, *?Arynchite* sp. (1), a leech, branching bryozoans, amphipods (12), two isopods (2), tanaids (9), a cumacean, three ostracods (57) and *Scalpellum* (2+). The largest species was *?Arynchite* sp., the most abundant *Chlocia pinnata* (33). Total numbers were estimated at more than 64 species and 239 specimens.

Polychaeta in the San Pedro shelf, showing order of occurrence in 5 to 50 fms.
+ indicates presence, - absence. Species represented by more than 10 specimens are indicated by *.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Owenia sp.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Protodorvillea gracilis	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Saccocirrus papillocercus	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amaeana occidentalis		+	+	-	-	+	-	-	-	+	+	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Amphicteis scaphobranchiata		+	-	-	+	-	+	+	+	-	+	-	-	-	-	+	-	+	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	+
Ancistrosyllis tentaculata		+	*	-	-	-	-	*	-	-	+	+	+	-	-	-	*	+	-	-	-	-	-	*	-	-	+	-	-	-	-	-	-	-	-
Anotomastus gordiodes		+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Axiothella sp.		+	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Brada pilosa		+	-	-	+	-	-	*	-	-	-	-	-	-	-	-	*	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaetozone corona		*	*	+	-	*	-	*	-	-	*	*	*	-	-	*	*	*	+	+	+	-	+	+	-	+	-	-	-	-	-	-	-	-	-
Chaetozone setosa		+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	*	-	*	-	*	-
Chone gracilis or C. sp.		+	+	-	+	+	-	+	-	-	+	-	-	-	+	+	*	-	+	-	+	-	+	+	*	*	-	-	+	*	+	-	-	-	-
Diopatra ornata		+	+	-	+	-	-	-	+	-	+	+	+	+	-	-	-	-	+	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-
Drilonereis nuda		+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Eteone californica		+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eteone dilatae		+	+	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glycera americana		+	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-
Goniada brunnea		*	+	+	+	+	+	*	-	-	*	+	+	+	-	+	+	+	-	+	+	-	-	-	-	+	+	-	-	-	-	+	-	+	

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Gyptis a. glabrus		+	+	-	+	+	+	+	-	-	-	-	-	+	-	-	+	-	-	+	+	-	-	+	-	-	-	-	-	+	-	-	-	-	-
Haploscoloplos elongatus		*	*	+	-	+	+	*	-	-	+	+	+	+	-	*	*	*	-	+	+	-	-	*	+	+	+	+	*	*	-	*	+	-	+
Harmothoe priops		+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laonice sp.		+	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris californiensis		+	+	-	-	+	-	+	-	-	+	-	-	-	-	+	+	+	-	+	-	-	-	+	+	-	-	+	-	+	-	-	-	+	-
Lumbrineris cruzensis		*	-	-	+	-	-	*	-	-	*	-	*	*	-	*	*	+	-	*	+	-	*	*	-	+	*	+	+	*	-	*	-	*	-
Magelona pacifica		+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	+	-	+	+	-	+	-	+	-	-	-
Marphysa disjuncta		+	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mediomastus californiensis		*	*	+	+	*	-	*	-	-	*	-	-	+	-	*	*	+	+	+	*	-	+	*	+	-	-	-	-	+	-	*	-	*	-
Melinna denticulata		+	-	+	+	+	-	+	+	-	+	+	-	-	-	-	+	+	-	+	*	-	-	+	+	-	-	-	-	-	-	-	-	-	+
Nephtys caecoides		+	-	-	-	-	-	-	-	+	+	-	+	+	-	+	-	+	-	-	+	-	-	-	+	+	+	-	*	+	-	-	-	-	-
Nereis procera		+	+	+	+	-	-	*	-	-	*	*	+	+	-	-	*	+	-	*	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-
Nothria elegans		+	+	+	-	-	-	+	-	-	+	-	*	*	-	+	*	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Notomastus tenuis		+	+	-	-	-	-	*	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Pherusa neopapillata		+	+	+	-	-	-	*	-	-	-	-	-	-	-	-	+	-	+	*	-	-	-	-	-	-	+	+	-	+	-	-	-	+	+
Phyllodoce sp.		*	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pilargis maculata		+	-	-	+	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pista disjuncta		+	-	-	-	-	-	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-
Poecilochaetus johnsoni		+	-	-	-	-	+	+	-	+	+	+	+	-	-	+	+	-	-	-	-	-	+	+	-	-	-	-	+	-	-	-	-	-	-

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Polydora sp.		+	-	+	-	-	-	*	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prionospio malmgreni		*	*	+	*	*	+	+	+	+	*	-	*	*	-	*	*	*	*	+	*	-	+	*	*	*	*	*	*	*	+	*	*	+	-
Prionospio pinnata		*	*	-	*	*	+	*	+	+	*	-	+	+	-	*	*	*	+	*	+	-	+	*	*	+	+	+	+	+	+	+	+	+	-
Prionospio pygmaeus		*	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Scalibregma inflatum		*	-	-	+	-	+	-	*	+	+	*	*	-	-	-	-	-	+	+	-	-	-	-	-	-	-	+	-	+	-	+	+	+	+
Sphaerosyllis sp.		+	-	+	-	-	-	+	-	-	+	-	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiophanes bombyx		+	+	+	-	+	-	-	-	+	+	-	-	+	-	+	+	+	*	+	+	-	*	+	+	+	-	+	+	-	-	+	-	-	+
Spiophanes fimbriata or S. sp.		+	-	-	-	-	-	+	-	-	-	*	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	+	-
Spiophanes missionensis		*	+	-	-	-	-	-	-	+	+	-	+	+	-	+	-	+	+	+	+	-	+	*	*	*	+	+	+	*	-	*	-	-	-
Tharyx monilaris		*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	+
Tharyx tesselata or T. spp.		*	*	+	+	+	-	*	-	-	+	-	+	+	-	+	*	*	*	*	*	-	+	+	+	+	+	+	+	*	-	*	-	*	+
Anaitides, checkered or A. sp.		.	+	-	-	-	+	+	+	-	-	-	-	-	-	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-
Aricidea lopezi		.	+	+	-	*	-	+	-	+	*	-	-	+	-	*	*	*	+	*	*	-	*	*	*	+	-	*	*	*	-	*	-	*	-
Aricidea uschakowi		.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	+	+	-	-	-	+	-	+	-	-	-
Euchone sp.		.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exogoninae or Exogone sp.		.	+	-	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Goniada littorea		.	+	+	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laonice cirrata		.	+	+	-	+	+	+	-	+	+	+	+	-	-	+	-	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-
Lumbrineris nr. sarsi		.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Magelona sacculata	.	+	+	–	+	–	–	–	–	–	–	–	+	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nephtys cornuta	.	+	–	–	+	–	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–
Onuphis eremita	.	+	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–
Pectinaria californiensis	.	+	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	+	+	–	–	–	*	+	+	+	+	*	*	*	+	*	+	+
Prionospio cirrifera	.	+	+	–	–	–	–	–	–	+	+	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	+	–	–	–	–	–	–
Syllis sp. or syllids	.	*	+	+	+	+	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–
Telepsavus costarum	.	+	–	–	–	–	+	–	–	+	–	–	+	–	+	+	–	+	+	+	–	*	*	+	–	–	–	–	–	–	–	+	–	+	+
Thalenessa spinosa	.	+	+	–	+	–	–	–	+	–	–	–	–	–	+	+	+	–	–	+	–	+	–	+	–	+	+	+	+	+	+	+	–	+	+
Ampharete arctica	.	.	+	+	–	–	+	–	–	+	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–
Anaitides sp.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aricidea neosuecica	.	.	+	–	–	–	+	–	–	–	–	–	–	+	–	+	–	+	–	–	–	–	+	+	–	+	*	–	–	+	–	+	–	–	–
Caulleriella bioculata	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Glycera sp.	.	.	+	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Harmothoe lunulata	.	.	+	–	–	–	–	–	+	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–
Lumbrineris spp.	.	.	+	+	+	+	+	+	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	+	+	–	+
Nephtys spp.	.	.	+	–	–	+	–	–	–	–	+	–	–	–	–	+	*	*	–	+	+	–	–	–	*	–	–	+	–	+	–	+	+	–	+
Amage anops	.	.	.	+	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–
Aricidea spp.	.	.	.	+	–	+	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Armandia bioculata	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Cirriformia luxuriosa	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cistenides ?brevicoma	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cossura candida	.	.	.	+	-	-	+	-	*	-	*	+	-	-	-	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-
Diopatra tridentata	.	.	.	+	-	-	-	+	-	-	+	-	-	-	-	*	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Dorvillea articulata	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Drilonereis longa or D. sp.	.	.	.	+	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eumida spp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	+	-	-	-	-	-
Fabricia sp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flabelligera commensalis	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Harmothoe sp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	+	-	-	+	+	-	-
Nereis zonata	.	.	.	+	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nothria iridescens	.	.	.	+	-	*	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	+	-	-	-
Ophiodromus pugettensis	.	.	.	+	-	+	-	+	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peisidice aspera	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+
Pherusa inflata	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Platynereis bicanaliculata	.	.	.	+	-	-	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Praxillella sp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	*	-	-
Pseudopotamilla sp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sthenelais sp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Anotomastus gordiodes	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirrophorus furcatus	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris limicola	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Paraonis gracilis	.	.	.	.	.	+	+	+	-	+	+	+	-	-	-	-	-	+	-	-	+	-	-	-	*	-	-	+	+	*	-	*	+	+	+
Phyllochaetopterus limicolus	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sternaspis fossor	.	.	.	.	.	+	-	+	-	-	+	+	-	-	-	-	+	-	-	-	-	-	-	*	-	-	+	-	+	+	-	-	*	-	-
Sthenelanella uniformis	.	.	.	.	.	+	-	-	-	-	+	*	-	-	-	+	-	+	+	+	+	-	-	*	*	+	*	*	+	+	-	+	+	+	+
Arabella semi-maculata	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brada sp.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ceratonereis sp.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eumida ?sanguinea	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hesperonoe sp.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris japonica	.	.	.	.	.	*	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magelona sp.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pherusa sp.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyllochaetopterus prolifica	.	.	.	.	.	*	-	-	-	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Polydora nr. caulleryi	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Schistocomus hiltoni	.	.	.	.	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiophanes spp.	.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Streblosoma crassibranchia or S. sp.	.	.	.	.	.	.	+	-	-	-	-	+	+	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boccardia sp.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Drilonereis ?longa	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harmothoe, reticulate	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pholoe glabra	.	.	.	.	.	.	.	+	-	+	+	-	+	-	-	-	*	*	-	+	-	-	-	*	+	*	*	*	+	*	+	*	*	*	-
Sabella crassicornis	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sthenelais tertiaglabra	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-
Aphrodita armifera	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Eulalia ?myriacyclum	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eulalia, bilineate	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eumida ?sanguinea	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Halosydna brevisetosa	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myxicola infundibulum	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nereis latescens	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paranaitis polynoides	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
?Phyllodoce ferruginea	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sabellaria cementarium	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Apistobranchus ornatus	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nalneris uncinata	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pilargis hamatus	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Scoloplos sp.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cirriformia spirabrancha	.	.	.	.	.	.	.	.	.	+	–	–	+	–	–	–	+	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Glycera capitata	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	+	–	–	–	–	–	–	–	–	–	+	+	–	–	+	–	–	–	+	–
Langerhansia heterochaeta	.	.	.	.	.	.	.	.	.	+	–	+	–	–	–	+	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lumbrineris pallida	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lysippe annectens	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Praxillella a. pacifica	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	*	+	–	–	–	–	–	–	+	–	+	–	+	–	–	–	–	+	–
Sabella sp.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Scoloplos acmeceps	.	.	.	.	.	.	.	.	.	+	–	–	–	–	+	+	–	–	–	–	–	–	+	+	–	–	+	–	–	–	–	–	–	–	–
Travisia ?brevis	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
unknown capitellid	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphicteis sp.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ancistrosyllis sp.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Asychis lacera	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Capitella capitata, subsp.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Exogone uniformis	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+
?Isolda sp.	.	.	.	.	.	.	.	.	.	.	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lumbrineris index	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Lumbrineris minima	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-
Notomastus sp.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Owenia f. collaris	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-
Pherusa sp.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
Phyllochaetopterus limicolus	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ampharete sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Arabella sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caulleriella gracilis	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-
Chone mollis	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
?Euclymene sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidasthenia virens, or L. sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pilargis berkeleyi	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodine bitorquata	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asychis disparidentata	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Glycera tenuis	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris nr. acuta	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	+	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-
Notomastus lineatus	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	+	-
Scoloplos armiger	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	*	-
Typosyllis spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Anaitides medi-papillata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Autolytus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Eulalia quadrioculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eupolymnia sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eusyllis transecta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Halosydna latior	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heteropale bellis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris latreillii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Genetyllis castanea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Harmothoe, cf imbricata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	!	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Notomastus magnus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sphaerodoridium minutum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	+	-
Glycera robusta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glycinde wireni	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maldane sarsi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	+
Megalomma, bioculate	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtys californiensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	+	-	-	-	+	-	-	-	+	-	+	-
Onuphis nebulosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	*	-	-	*	-	-	-	-	-	-	-	-	-	-	-
Pista cf. cristata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	+	-	-	+	+	-	-	-	-	+	+	-	-	-	-

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Tharyx monilaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Axiothella rubrocincta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	+	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-
Glycera spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-
Glycera oxycephala	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-
hesionid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtys ?glabra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyllodoce cf. papillosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loandalia fauveli	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Onuphis parva	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-
Pherusa capulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Ancistrosyllis cf. bassi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anobothrus gracilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artacamella hancocki	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	+	-	-	-	-	-	+	-	-	+	-
Axiothella rubrocincta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	*	-	-	-	-	-	*	-	*	-	-	-
Cirrophorus furcatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-
Lanice conchilega or L. sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	+	-	+	-	-	-	-	-	-	-
?Nereiphylla sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyllodoce sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
Polycirrus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	+	-	+	-	-	+	-	-	-	+

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Goniada sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–	–	–	–	–	–	–
Hesperonoe laevis or H. sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–	–	–	–	–	–	–
Magelona pitelkai	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–
Ophelia limacina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	–	–	–	–	–	–	–	–	–	–	–	–
Chone sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	–	–	–	–	–	–	–	–	–	–	*
Magelona sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–
Terebellides stroemii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	+	–	–	+	+	+	–	–
Chloeia pinnata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	–	*	*	*	+	*	+	+	*	
Myriowenia californiensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	+
Onuphis stigmatis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–
Sphaerodoridium ?biserialis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–
Tharyx ?multifilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–
Asychis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–
Myriochele gracilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	+	–	+	+	
Nothria geophiliformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–
Anaitides sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	+	–	–	–
Brada sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
Eulalia, bilineate	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
Eunice americana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–	–	–	–

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Halosydna brevisetosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Nephtys ferruginea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	+	–	–	–	*	–
Chaetozone spinosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	*	–	–	–	–	–	–
Isocirrus longiceps	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–
Nothria stigmatis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–
Pista moorei	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–
Polydora sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–
Eumida bioculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Gyptis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Nothria sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–
Aedicirra ramosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–
Asychis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–
Praxillella gracilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–
Sphaerodorum papillifer	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–
Spio punctata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	+
Chaetozone sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–
Chone minuta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
EXOGONINAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Megalomma splendida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	+

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pista sp.																																+	-	-	+
Sphaerodoridium sp.																																+	-	-	-
Aphrodita sp.																																	+	-	-
Glycera sp.																																	+	-	+
Odontosyllis sp.																																	+	-	-
Panthalis sp.																																	+	-	-
Travisia ?pupa																																	*	-	-
Panthalis pacifica																																		+	-
Aglaophamus sp.																																			+
Ammotrypane aulogaster																																			+
Antinoella sp.																																			+
Aricidea sp.																																			+
Dorionereis sp.																																			+
Lepidasthenia interrupta																																			+
Lysippe annectens																																			+
Magelona sp.																																			+
Nothria sp.																																			+
Oncoscolex pacificus																																			+
Paradexiospira vitrea																																			+

Polychaeta in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Paranaitis polynoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Prionospio spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Rhamphobrachium longisetosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Scoloplos sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Sphaerodorum sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Vermiliopsis biformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+

Echinodermata in the San Pedro shelf, showing order of occurrence in 5 to 50 fms.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Dendraster excentricus or D.sp.	+	+	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-
Strongylocentrotus sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphiodia occidentalis		+	-	-	-	-	-	+	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphiodia urtica		+	+	-	-	-	-	*	-	-	+	*	-	+	-	+	*	+	-	-	-	-	+	*	*	*	*	*	*	*	*	*	*	*	+
Amphipholis squamata		*	+	-	-	-	-	*	-	-	*	-	+	*	-	+	*	+	+	-	+	-	-	-	+	+	+	+	+	+	-	+	*	+	+
ophiuroid		.	.	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
holothuroid		.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+
Astropecten californicus or A.sp.		.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	+	+	-	-	+	-	+	+	+	-	-	-	-	-	-	-	-	+	-
Lytechinus anamesus		.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	+	*	-	+	-	+	-	-	+	-	-	-	-	-	-	-	+
Strongylocentrotus franciscanus		.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strongylocentrotus purpuratus		.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Echinodermata in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Amphiodia digitata	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	*
Amphioplus hexacanthus	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	*	*	-	-	+	-	-	*	-	*	*	-	-	-	-	-	-	-	-
Lovenia cordiformis	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+
Leptosynapta albicans or L. sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	+	+	+	-
Amphiodia psara	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Pentamera pseudopopulifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Ophiothrix spiculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Cucumaria sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Dendraster laevis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiodoma sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiuroconis bispinosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-
Amphipholis pugetana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Ophiura lutkeni	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	*	-	-	-	-	-	-	+	+
Amphiura arcystata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	+	-
Amphiacantha amphacantha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-
Florometra perplexa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Luidia foliolata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-
Sclerasterias heteropaes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+

Mollusca in the San Pedro shelf, showing order of occurrence in 5 to 50 fms.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Crenella decussata	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spisula planulata	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Macoma nasuta		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Modiolus sp.		+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Nassarius perpinguis		+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
?Psephidia sp.		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Siliqua lucida		+	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solen sicarius		+	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Spisula sp.		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balcis rutila		.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Donax gouldi		.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linga richthofeni		.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	+	-	-	-	-	-	+	-	-	-
Mangelia barbarensis		.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Olivella baetica		.	*	-	-	+	-	-	-	-	+	-	-	+	-	*	-	+	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-
Ophiodermella incisa		.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	+	+	-	-	+	-	-	-	-	-	-	-
Retusa (C.) harpa		.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rochefortia aleutica or R.sp.		.	+	-	-	-	-	-	-	-	+	-	+	*	-	+	+	-	-	-	-	-	+	-	+	+	+	+	+	+	-	+	-	+	-
Tellina buttoni		.	*	*	-	-	-	-	-	+	-	-	+	-	-	*	-	*	-	-	-	-	+	*	-	-	-	+	-	-	-	-	-	-	-
Terebra pedroana		.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mollusca in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Turbonilla spp.	.	+	-	-	+	-	+	-	+	+	-	-	+	-	+	+	-	-	-	-	-	-	+	-	+	-	+	-	+	+	-	+	-	-	-
clams, others	.	+	-	-	-	-	-	-	-	-	+	-	+	-	-	+	+	+	-	-	-	-	+	+	+	+	-	+	-	-	-	+	-	-	+
Aequipecten c. aequisulcatus	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuculana taphria	.	.	+	-	+	-	-	-	+	+	-	+	-	-	+	*	+	-	-	-	-	-	-	+	-	-	+	-	+	-	-	-	-	+	-
Tellina idae	.	.	+	-	-	-	-	-	-	+	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Solen spp.	.	.	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Tellina spp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Compsomyax subdiaphana	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	+	+	-	+	-	+	+	-	-	-	+	-
Ensis myrae	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
?Macoma sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Periploma discus	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Poromya sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Solamen columbianum	.	.	.	.	+	-	+	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Tellina carpenteri	.	.	.	.	*	+	-	-	-	*	-	-	+	-	-	*	-	-	-	+	-	-	-	-	+	-	+	-	+	+	-	+	+	+	-
Polinices sp.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acteon puncto-coelata	.	.	.	.	.	.	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Axinopsida serricata	.	.	.	.	.	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	*	*	+	*	-	*	-
Cadulus sp.	.	.	.	.	.	.	+	-	-	*	-	-	+	-	+	+	+	-	-	-	-	+	+	+	-	+	+	-	-	-	+	-	-	-	-
Odostomia sp.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-

Mollusca in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Periploma sp.	.	.	.	.	.	.	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bursa californica	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Conus californicus	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Lima dehiscens	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Modiolus modiolus	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pecten sp.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crystallophrisson spp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cylichna diegensis	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Dentalium rectius	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Macoma yoldiformis	.	.	.	.	.	.	.	.	+	*	-	+	-	-	-	*	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Epitonium sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-
Parvilucina tenuisculpta	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	+	-	-	-
scaphopods	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solen rosaceus	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
solenogasters	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	+	+	-	+	-	-	+	-	-
Tagelus californianus	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trachycardium quadragenarium	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epitonium bellastriatum	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lucinisca nuttalli	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mollusca in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Crepidula norrisiarum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Chlamys latiauratus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–
Crenella divaricata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–
Pandora bilirata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	+	–	–	+	–	+	–	–	–
Periploma planiuscula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Volvulella cylindrica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Balcis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	+	–	–	+	–	+	–	–	–	–	–	–
Crenella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	+	–	–	–	–	–	–	–	+	–	–	–	–	–	–
Cylichna attonsa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	–	–	–	–	–	+	–	–	+	–	–	–	–	–	–	–	–
Eulima californica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	+	+	–	–	–	–	–	–	–
Lucinoma annulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–
Eulima rutila	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
?Kellia sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Odostomia herilda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Plagioctenium circularis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rochefortia cf. golischi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–
Turbonilla cf. attrita	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Turbonilla santarosana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Volvulella tenuissima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–

Mollusca in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
?Crepidula sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
?Margarites sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Micranellum sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thyasira ?gouldi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphissa undata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-
Bittium ?larum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-
chitons	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+
pholad	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
vermetid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Bittium subplanatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-
Elaeocyma emperosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Gari edentula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Modiolus neglectus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Polinices lewisii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-
Saxicava arctica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Solemya panamensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	-	-	-	-	-	-	-	-	-
Strombiformis californica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-
Turbonilla antimunda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Acila castrensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-

Mollusca in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Amygdalum pallidulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	*	+	+	–	+	+
Chlamys sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	–	–	–	–	–	–	–	–
Lyonsia sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	+	–	–	–
Mangelia sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	+	–	+	–	+	–	+	–
Nemocardium centrifilosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	+	–	+	–	+	–	+	–
Saxicavella pacifica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–
Volvulella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	+	–	+	–	+	–
Balcis ?compacta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
Capulus californicus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	–	–	–	–	–	–	–
Mangelia arteaga	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
Pseudomusium ?incongrum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
slugs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
Sulcoretusa taphria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
Acteocina intermedia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Aglaja sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	+	–	–
Adontorhina cyclia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	*	*	+	+	–	+	–
Bittium sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–
Dentalium neohexagonum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–
?heteropod	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–

Mollusca in San Pedro shelf (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Nucula sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–
Nucula tenuis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	+	–	–	–
Nuculana ?hamata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–
Bittium catalinensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–
Erycina chacei	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–
Acteocina culcitella	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–
Cardiomya pectinata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–
Nucula carlottensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–
Thracia trapezoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–
Nitidella ?gouldi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–
Pseudopythina chacei	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	–
Psephidia lordi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–

SAN PEDRO SLOPE

The San Pedro (SP) slope, in depths below 60 fms, is an oceanward down-sloping extension of the San Pedro shelf. It is dissected by the San Gabriel sea valley; near its outer limits it surrounds the Lasuen sea mount and Sixmile bank. One of its greatest depths, 440 fms, is attained north of Sixmile bank (no. 213 on Map, Pt. 1). Its terrain is overall irregular, compared with that of adjacent areas. Surface sediments are mainly silt, mud and clay, with rocky rubble and gravel in the vicinities of the sea mounts.

The fauna in the soft bottoms is diversified and patchy. Biomass values at depths of 90 to 100 fms approach 100 grams to a sample; these values diminish to a fraction of a gram at greatest depth, showing a more or less steady decline with depth. Rocky outcrops occur in 170 and 180 fms near no. 174 (see Map, Pt. 1), and in 240 fms at no. 197; these are also the sites of siliceous sponge and conspicuous representatives of echinoderms (Sta. 2987, 2416). The values of specific diversity, by increasing depth, are illustrated:

Sta. no.	Depth in fms.	Size of sample in cuft	No. of species	No. of specimens
2292	60	0.81	87+	576+
5746	68	1.13	92	822
5747	90	0.88	98	1546
4778	100	2.96	40	227
2423	175	1.13	42+	107+
2884	190	1.93	23	123
2306	215	2.64	29+	158+
2342	230	0.31	29	146
2372	230	0.81	36+	203
2898	240	1.13	26	73
2894	253	0.81	17	37
2893	265	2.58	23+	51
2886	270	2.60	29+	49
2635	278	2.99	40+	75
2644	310	5.74	21	37
2901	312	3.02	27	40
2900	345	3.08	25	62
2844	362	3.15	17	67
2370	366	2.83	17	47
2368	385	2.26	17	37
2369	390	3.33	22	52
2440	415	3.27	19	72
2802	420	2.64	26	48
2836	430	2.88	15	31
2229	440	0.63	20	48

The following samples, numbered 1 to 31 on the charts, come from the San Pedro slope, in depths of 60 to 446 fms. Polychaeta, echinoderms and mollusks are listed on the charts by increasing depths; others are summarized in the following analyses.

1. Sta. 2292 (no. 104). Upper end of San Gabriel sea valley, in 60 fms. OPG took 0.81 cuft of fine grayish green sand, with many animals. In addition to those named on the chart, the following were present: *Harenactis* (1), *Monobrachium* (2 colonies), a nemertean (2), a turbellarian (1), four amphipods (113), an isopod (2+), ostracods (many) and a mysid (1). The largest species was *Lumbrineris bicirrata*; the most abundant were *Amphiodia urtica* (177), *Adontorhina cyclia* (78), *Aligena* sp. (74), *Amphipholis squamata* (53), and *Chloeia pinnata* (47).

Numbers of species and specimens totalled:

polychaetes	53 species,	350 specimens
echinoderms	11	310
mollusks	15	191
crustaceans	6+	122+
others	2	3
Total:	87+ species,	976+ specimens

2. Sta. 5746 (near no. 129). SW of Newport, in 68 fms. OPG took 1.13 cuft of light green, foraminiferan sand with many animals. In addition to those named on the chart, the sample contained a nemertean (3), a sipunculid (1), 16 amphipods (86), three isopods (7), two or more tanaids (20) six ostracods (236) and a juvenile crab (1). The largest individual was *Antiplanes ?perversa*, and the most abundant species were *Onuphis nebulosa* (135), *Tharyx tesselata* (36), and *Magelona pacifica* (20).

Numbers of species and specimens totalled:

polychaetes	48 species,	429 specimens
echinoderms	2	3
mollusks	6	13
crustaceans	33	369
others	3	8
Total:	92 species,	822 specimens

3. Sta. 5747 (near no. 123). 9.2 mi south of Los Angeles light, in 90 fms. OPG took 0.88 cuft of very fine green sand. Wet weight of the larger animals was 96.7 grams, of which echinoids were 62.7, ophiuroids 17.0, polychaetes 16.6, and all others less than 0.5 grams. In addition to

those named on the chart, the sample contained *Monobrachium parasitum* (11 colonies on *Pseudopythina chacei*), a nemertean (2), a polyclad (1), a sipunculid (4), ten amphipods (137), three isopods (11), tanaids (8), three ostracods (about 400), and four cumaceans (32). Largest species were *Nephtys glabra* and brissopsid urchins; most abundant were *Chlocia pinnata* (102) and *Amphiodia urtica* (100). Peak numbers were attained also by *Tharyx monilaris* (70), *Paraonis gracilis* (58), *Pista moorei* (36), and *Adontorhina cyclia* (35).

Numbers of species and specimens totalled:

polychaetes	46 species,	667 specimens
echinoderms	7	138
mollusks	18	130
crustaceans	23	593
others	4	18
Total:	98 species,	1546 specimens

4. Sta. 4778 (no. 184). S of Laguna Beach, in 100 fms. OPG took 2.96 cuft of green mud. Animals included 8 amphipods (20), an isopod (3), a cumacean (3) and an ostracod (1), in addition to those named on the chart. Largest individuals were *Molpadia intermedia, Pista disjuncta* and *Travisia pupa.* Most abundant or conspicuous were *Chlocia pinnata* (56), *Amphiodia urtica* (44), and *Pectinaria californiensis* (37).

Numbers of species and specimens totalled:

polychaetes	21 species,	137 specimens
echinoderms	6	55
mollusks	2	8
crustaceans	11	27
Total:	40 species,	227 specimens

Sub. 4. Sta. 2177 and 2438 (no. 267). Outermost end of the San Pedro area, in 172 and 153 fms. OPG took sandy mud (2177) and rock (2438) with attached tubes of unnamed polychaetes, representatives of a polynoid, a sphaerodorid and a maldanid. The sample from sandy mud contained many polychaetes with *Chlocia pinnata* the most conspicuous; three kinds of echinoderms, *Amphiodia urtica* (18), *Amphiura arcystata* (1), and *Brissopsis pacifica* (5), and five mollusks: *Cadulus tolmiei* (8), *Cardita ventricosa* (7), *Cyrilla minuta* (41), *Solamen columbianum* (2) and *Tellina carpenteri* (16).

Sub. 4. Sta. 2987 (no. 174). 13.7 mi SE of Los Angeles light, in 177-189 fms. The biological dredge took rocks and echinoderms with siliceous sponge and a lamprey eel.

5. Sta. 2416 (no. 174). 13.5 mi SE of Los Angeles light, in 180 fms. The biological dredge took large boulders and many echinoderms (see chart). Most abundant were *Ophiopholis bakeri* (42) and *Ophiacantha diplasia* (22).

6. Sta. 2884 (no. 154). 5.6 mi SW of Newport pier, in 190 fms. OPG took 1.93 cuft of gray-green mud. Present were a ceriantharian (1), an anemone with warty epithelium (2), ?*Arynchite* (1), small crustaceans (not examined), and those named on the chart. Largest species was *Pista disjuncta*, and most abundant *Chlocia pinnata* (70).

Numbers of species and specimens totalled:

polychaetes	12 species,	103 specimens
echinoderms	4	11
mollusks	4	5
others	3	4
Total:	23 species,	123 specimens

7. Sta. 2306 (no. 98). 6.2 mi from Pt. Fermin light, in 215 fms. OPG took 2.64 cuft of mud and gray clay with large animals. In addition to those named on the chart, there were a few small crustaceans. Largest species was *Asychis disparidentata*, and most abundant *Chlocia pinnata* (51). Total numbers were estimated at more than 38 species, and 175 specimens.

8. Sta. 2342 (no. 262). 5.9 mi E of East End, SCI, in 230 fms. OPG took 0.31 cuft of sandy mud with sticky oil globules. The sample contained siliceous sponge, a nemertean (1), a tongue of a large echiuroid (1), amphipods (4), an anthurid isopod (1), ostracods (32), in addition to those named on the chart. Largest species was *Nephtys assignis*, and most abundant *Chlocia pinnata* (46).

Numbers of species and specimens totalled:

polychaetes	16 species,	73 specimens
echinoderms	2	9
mollusks	5	24
crustaceans	3+	37
others	3	3
Total:	29+ species,	146 specimens

9. Sta. 2372 (no. 199). 16 mi NE of East End, in 230 fms. OPG took 0.81 cuft of gray sandy mud, with many foraminiferans, small tesselated sponge balls, a nemertean (3), a polyclad (1), amphipods (14), an anthurid isopod (6), two ostracods (27), a small crab (1), in addition to those named on the chart. Largest species was *Nephtys punctata*,

and most abundant were *Praxillella affinis pacifica* (26), and *Tellina carpenteri* (24).

Numbers of species and specimens totalled:

polychaetes	23 species,	102 specimens
echinoderms	1	4
mollusks	5	42
crustaceans	5+	48
others	3	7
Total:	37+ species,	203 specimens

10. Sta. 2898 (no. 197). 12.7 mi SW of East End, in 240 fms. OPG took 1.13 cuft of blue-green mud with rocky rubble and shale. In addition to those named on the chart the sample contained a smooth anemone (1), and a sand-covered one (1), a nemertean (1), an amphipod (2), a caprellid (7), a gnathid isopod (1). Largest individual was *Thelepus setosus*; none was outstandingly abundant.

Numbers of species and specimens totalled:

polychaetes	14 species,	35 specimens
echinoderms	1	8
mollusks	5	17
crustaceans	3	10
others	3	3
Total:	26 species,	73 specimens

11. Sta. 2894 (no. 219). 11.5 mi SW of Newport pier, in 253 fms. OPG took 0.81 cuft of gray-green, sandy mud with few animals. In addition to those named on the chart, there were a nemertean (3), an amphipod (3) and a cumacean (1). Largest animal was a nemertean, and most conspicuous *Onuphis nebulosa* (6).

Numbers of species and specimens totalled:

polychaetes	11 species,	19 specimens
mollusks	3	11
crustaceans	2	4
other	1	3
Total:	17 species,	37 specimens

12. Sta. 2895 (no. 200). 9.9 SW of Newport pier, in 265 fms. OPG took 2.58 cuft of grayish green mud with arenaceous foraminiferans, small tesselated sponge balls, a large nemertean (2), an echiuroid (1), amphipods (5), two isopods (2), in addition to those named on the chart. Largest individuals were an echiuroid and a nemertean; none was outstandingly abundant.

Numbers of species and specimens totalled:

polychaetes	13 species,	31 specimens
echinoderms	2	2
mollusks	5	12
crustaceans	3+	7
Total:	23+ species,	52 specimens

13. Sta. 2886 (no. 201). 9.2 mi SW of Newport pier, in 270 fms. OPG took 2.6 cuft of grayish green mud. A large nemertean (2), an echiuroid (1), amphipods (12), a cumacean (1), an ostracod (1), and a small enteropneust, were present in addition to those named on the chart. Largest animals were *Brissopsis pacifica* and a nemertean. None was abundant.

Numbers of species and specimens totalled:

polychaetes	13 species,	18 specimens
echinoderm	1	1
mollusks	7	12
crustaceans	5+	14
others	3	4
Total:	29+ species,	49 specimens

14. Sta. 2635 (no. 249). S of Lasuen sea mount, in 278 fms. OPG took 2.99 cuft of greenish yellow and black, marbled clay, with small rocks and considerable rubble. Screenings contained small tesselated sponge balls, two anemones (5), a nemertean (2), an echiuroid (2), amphipods (6), a shrimp (1), in addition to those named on the chart. Largest species was *Notomastus magnus*; none was notably abundant.

Numbers of species and specimens totalled:

polychaetes	26 species,	38 specimens
echinoderms	6	13
mollusks	2	8
crustaceans	2+	7
others	4	9
Total:	40+ species,	75 specimens

15. Sta. 2644 (no. 222). NE of Lasuen sea mount, in 310 fms. Campbell grab took 5.74 cuft of greenish gray clay with foraminiferans. In addition to those named on the chart, there were a large nemertean (1), *?Arynchite* (1), and an amphipod (6). Largest individuals were a nemertean and an echiuroid; none was abundant.

Numbers of species and specimens totalled:

polychaetes	12 species,	19 specimens
echinoderms	2	3
mollusks	4	6
crustaceans	1	6
others	2	3
Total:	21 species,	37 specimens

16. Sta. 2901 (no. 217). Lower end of San Gabriel sea valley, in 312 fms. OPG took 3.02 cuft of grayish green mud with many arenaceous and calcareous foraminiferans. The sample contained a large ceriantharian, *Cerebratulus* (1), two amphipods (3), a caprellid (1), a cumacean (1), and an enteropneust (2). Largest animals were *Brissopsis pacifica*, a ceriantharian, and a nemertean; none was abundant.

Numbers of species and specimens totalled:

polychaetes	14 species,	22 specimens
echinoderms	3	7
mollusks	6	8+
crustaceans	4	5
others	3	5
Total:	30 species,	47+ specimens

17. Sta. 2900 (no. 231). E of Sixmile bank, in 345 fms. Grab took 3.08 cuft of mud. The sample contained those listed in the chart, together with an anemone with wrinkled epithelium (3), a large red ceriantharian (1), a red nemertean (1), a sipunculid (3), two amphipods (3), a caprellid (1) and a cumacean (1). Largest animal was a ceriantharian, and none was abundant.

Numbers of species and specimens totalled:

polychaetes	11 species,	33 specimens
echinoderms	5	9
mollusks	2	7
crustaceans	3	5
others	4	8
Total:	25 species,	62 specimens

18. Sta. 2350 (no. 241). 6.75 mi SE of Long Pt., SCI, in 350 fms. OPG took 0.1 cuft of rocks, mud, sand, rubble and siliceous sponge. All animals were small, with the largest *Chaetozone* and *Lepidonotus*. The most abundant was *Ophiacantha* sp. (10). Numbers of species and specimens included polychaetes with 9 species and 11 specimens, and echinoderms with 3 species and 18 specimens.

19. Sta. 2844 (no. 233). SW of Lasuen sea mount, in 362 fms. OPG took 3.15 cuft of sticky grayish green mud with many calcareous foraminiferans, long sponge spicules and ophiuroid fragments. In addition to the species named in the chart, there were an anemone (1), a nemertean (4), and an amphipod (1). Largest species was *Amphiura arcystata*, and most abundant *Aricidea uschakowi* (16) and *Tharyx* spp. (23).

Numbers of species and specimens totalled:

polychaetes	11 species,	55 specimens
echinoderms	2	3
mollusk	1	3
crustacean	1	1
others	2	2
Total:	17 species,	64 specimens

20. Sta. 2370 (no. 232). Lower end of San Gabriel sea valley, in 366 fms. OPG took 2.83 cuft of grayish green mud with foraminiferans, small amount of siliceous sponge, and many small animals. In addition to those named on the chart, an amphipod (3) and a cumacean (1) were present; there was no large individual; most abundant was *Tharyx* sp.

Numbers of species and specimens totalled:

polychaetes	11 species,	26 specimens
echinoderm	1	3
mollusks	3	14
crustaceans	2	4
Total:	17 species,	47 specimens

21. Sta. 2640 (no. 241). S of Sixmile bank, in 370 fms. OPG took about a liter of brown-black, friable rock, clayey gravel, animals and siliceous sponge spicules. In addition to the species named on the chart, there were present an isopod (3), *Munida quadrispina* (galatheid crab) (1), and a colonial tunicate. Largest animal was the crab, and none was abundant. Total number of species 15, and specimens 27.

22. Sta. 2368 (no. 242). S of Sixmile bank, in 385 fms. OPG took 2.26 cuft of sandy mud, rocks, siliceous sponge and foraminiferans. A dark, warty anemone was present, an amphipod (3), and a tanaid (2), in addition to those named on the chart. Largest individual was *Chloeia pinnata*, and most abundant were *Lumbriclymene lineus* (9) and *Tharyx* sp. (9).

Numbers of species and specimens totalled:

polychaetes	11 species,	28 specimens
mollusks	2	2
crustaceans	2	5
others	2	2
Total:	17 species,	37 specimens

23. Sta. 2369 (no. 243). 3 mi SE of Sixmile bank, in 390 fms. OPG took grayish green mud with siliceous sponge, calcareous foraminiferans, and many small animals. In addition to those named on the chart there were two amphipods (8), and a pycnogonid (1). None was large and none abundant.

Numbers of species and specimens totalled:

polychaetes	11 species,	26 specimens
echinoderms	4	11
mollusks	4	6
crustaceans	2	8
other	1	1
Total:	22 species,	52 specimens

24. Sta. 2440 (no. 244). Lowest end of San Gabriel sea valley, in 415 fms. Grab took 3.27 cuft of greenish gray clay and mud, with many foraminiferans, minute mud balls, tube fragments of *Phyllochaetopterus limicolus* and a few animals. An anemone measuring 10 by 28 mm, a nemertean (1), four amphipods (5), an isopod (1), were present in addition to those named in the chart. The largest individual was an anemone.

Numbers of species and specimens totalled:

polychaetes	7 species,	34 specimens
echinoderm	1	12
mollusks	4	18
crustaceans	5	6
others	2	2
Total:	19 species,	72 specimens

25. Sta. 2352 (no. 227). W of Sixmile bank, in 420 fms. OPG took 2.5 cuft of grayish green mud with considerable siliceous sponge and orbicular foraminiferans. In addition to those named on the chart, the lot included a small sea pen. The largest individual was *Thelepus setosus*, in a tube 170 mm long by 12 mm across; it was externally adorned with attached foraminiferans and tubes of *Protis*.

Numbers of species and specimens totalled:

polychaetes	3 species,	17 specimens
echinoderms	3	4
mollusks	3	3
other	1	1
Total:	10 species,	25 specimens

26. Sta. 2802 (no. 194). N of Sixmile bank, in 420 fms. Grab took 2.65 cuft of bluish greenish gray mud with siliceous sponge and foraminiferans. In addition to those named on the chart, there was a large and a small anemone, a nemertean (1), and a cumacean (1). Largest species were *Melinnexis pacifica* and *Myxoderma platyacantha.*

Numbers of species and specimens totalled:

polychaetes	13 species,	38 specimens
echinoderms	2	3
mollusks	2	3
crustacean	1	1
others	2	3
Total:	20 species,	48 specimens

27. Sta. 2859 (no. 227). W of Sixmile bank, in 425 fms. OPG took 2.58 cuft of greenish gray sand and mud with many foraminiferans and much siliceous sponge. The lot contained a sea pen (2), a nemertean (1), a sipunculid (1), an ostracod (1) and *Callianassa goniophthalma* (1). The large individual was the ghost shrimp.

Numbers of species and specimens totalled:

polychaetes	10 species,	12 specimens
mollusks	3	6
crustaceans	2	2
others	3	3
Total:	18 species,	23 specimens

28. Sta. 2836 (no. 145). Eastern sill of San Pedro basin, in 430 fms. OPG took 2.88 cuft of greenish gray sticky mud, with many foraminiferans, tubes of *Phyllochaetopterus* and diversified animals. In addition to those named in the chart, a ghost shrimp (1), an isopod (1), and a small enteropneust (1) were present.

Numbers of species and specimens totalled:

polychaetes	8 species,	24 specimens
echinoderm	1	1
mollusks	3	3
crustaceans	2	2
other	1	1
Total:	15 species,	31 specimens

29. Sta. 2229 (no. 213). N of Sixmile bank, in 440 fms. OPG took 0.63 cuft of sandy clay, gravel, rubbly rocks, with siliceous sponge, foraminiferans, and diversified animals. A gorgonian and sea pen were present, in addition to those named in the chart.

Numbers of species and specimens totalled:

polychaetes	17 species,	44 specimens
echinoderm	1	2
others	2	2
Total:	20 species,	48 specimens

Sub 29. Sta. 2341 (no. 263). 7.6 mi E of East End, SCI, in 440 fms. OPG took 0.1 cuft of fine sandy mud with almost no life; only a small ophiuroid and fragments of a maldanid and *Tharyx* were present.

30. Sta. 2839 (no. 212). NW of Sixmile bank, in 446 fms. Campbell grab took 3.4 cuft of greenish gray sticky mud with foraminiferans, and siliceous sponge. In addition to those named on the chart, a nemertean (1) and an enteropneust (1) were present. Solenogasters, with 3 species and 12 specimens, were unusual.

Numbers of species and specimens totalled:

polychaetes	7 species,	17 specimens
echinoderms	2	2
mollusks	5	14
others	2	2
Total:	16 species,	35 specimens

31. Sta. 2837 (no. 211). NW of Sixmile bank, in 454 fms. Campbell grab took 3.08 cuft of greenish gray sticky mud with foraminiferans, tubes of *Phyllochaetopterus limicolus*, *Protis pacifica* and siliceous sponge. In addition to those named on the chart, a sipunculid (1) and a compound ascidian (2) were present.

Numbers of species and specimens totalled:

polychaetes	5 species,	18 specimens
echinoderm	1	1
mollusks	3	4
others	2	3
Total:	11 species,	26 specimens

Polychaeta in the San Pedro slope and sill, showing order of occurrence in 60 to 466 fms.
+ indicates presence, - absence. Species represented by more than 10 specimens are indicated by *.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Ammotrypane aulogaster	+	-	-	+	+	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aricidea lopezi	+	*	-	-	-	-	-	-	*	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Aricidea uschakowi	+	-	+	-	-	-	+	-	-	-	-	+	-	-	-	-	+	-	*	-	-	-	-	-	-	-	-	-	-	-	-
Aricidea spp.	+	-	-	-	+	-	-	-	+	-	-	+	-	-	+	-	+	+	-	-	-	-	-	+	-	+	+	+	-	+	+
Artacamella hancocki	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brada pluri-branchiata	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloeia pinnata	*	-	*	*	-	*	*	*	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Chone spp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Cirrophorus aciculatus	+	-	*	-	+	-	+	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cossura candida	+	-	+	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	+	-
disomid	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exogone uniformis	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glycera ?capitata	+	+	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Goniada brunnea	+	+	+	+	+	-	+	-	-	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Haploscoloplos elongatus	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Harmothoe scriptoria	+	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Langerhansia heterochaeta	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laonice cirrata	*	*	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Lumbrineris bicirrata	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris spp.	*	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-
Lysippe annectens	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Maldanella robusta	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
maldanids	*	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	+	-	-	-
Marphysa disjuncta	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mediomastus californiensis	+	-	*	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melinna denticulata	+	+	-	-	-	-	*	+	-	-	+	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtys spp.	+	*	*	-	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nerinides maculata	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nerinides pigmentata	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ninoe gemmea	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nothria iridescens	+	-	-	+	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Onuphis parva	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paraonis gracilis	*	+	*	-	+	-	+	+	*	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pectinaria californiensis	*	+	*	*	+	+	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pherusa neopapillata	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pholoe glabra	*	+	*	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pilargis berkeleyi	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Pista disjuncta	+	-	-	*	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praxillella a. pacifica	+	-	-	-	-	-	+	+	*	+	+	+	+	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prionospio malmgreni	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prionospio pinnata	*	*	*	-	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scalibregma inflatum	+	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sphaerodoridium minutum	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spio punctata	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiophanes fimbriata	+	-	+	+	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Sternaspis fossor	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sthenelais tertiaglabra	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terebellides stroemii	+	+	-	-	-	-	-	+	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-
terebellids	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Tharyx spp.	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	*	-	+	*	-	-	-	+	-	*	-	-
Travisia gigas	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Travisia pupa	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anaitides spp.	.	+	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aricidea neosuecica	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ceratocephale c. americana	.	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaetozone corona	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Chaetozone setosa	.	+	-	-	-	-	-	+	+	-	-	+	-	-	-	-	+	-	+	+	-	+	-	-	-	-	-	-	-	-	-
Dorvillea articulata	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eulalia spp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris californiensis	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris cruzensis	.	*	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magelona pacifica	.	*	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Megalomma sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naineris uncinata	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
nereid	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nicomache sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtys ferruginea	.	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nothria spp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Notomastus lineatus	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Notomastus tenuis	.	*	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oncoscolex pacificus	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Onuphis nebulosa	.	*	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peisidice aspera	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyllochaetopterus limicolus	.	+	+	+	+	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	+	+	-	-	-	+	-	+	-	+
Pista nr. cristata	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Polycirrus sp.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodine bitorquata or R. sp.	.	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-
Sphaerodorum sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiophanes, anoculate	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
syllids	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Tharyx monilaris	.	+	*	-	+	+	-	+	+	+	-	+	+	+	-	-	+	-	+	-	-	-	+	+	-	+	-	+	-	+	-
Tharyx tesselata	.	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vermiliopsis sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphicteis scaphobranchiata	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	-
Chaetozone hamata	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drilonereis spp.	.	.	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Euclymene sp.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eumida, trilineate	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gyptis a. glabra	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris cf. tetraura	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maldane sarsi or M. sp.	.	.	+	+	+	+	+	+	-	-	-	-	-	-	-	+	+	-	-	+	-	-	-	+	-	-	-	-	-	+	-
Myriochele gracilis	.	.	+	-	-	-	-	-	+	-	-	-	-	+	-	+	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-
Nephtys glabra	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pista moorei	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Praxillella gracilis	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Travisia brevis	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telepsavus costarum or T. sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Anaitides madeirensis	.	.	.	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ancistrosyllis tentaculata	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-
Glycinde armigera	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris index	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphárete sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-
Brada glabra	.	.	.	.	+	+	-	+	-	-	+	-	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Eunice americana	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ilyphagus sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Notomastus sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	+	-	-	-
phyllodocid	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pilargis hamatus	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prionospio cirrifera or P. sp.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Streblosoma sp.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammotrypane sp.	.	.	.	.	.		+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Ancistrosyllis cf. rigida	.	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asychis disparidentata	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
capitellids	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harmothoe lunulata	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heterospio catalinensis	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nothria pallida	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirrophorus furcatus	.	.	.	.	.	.	.	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
euclymenid	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtys assignis	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtys cornuta	.	.	.	.	.	.	.	+	-	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiophanes sp.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aglaophamus sp.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ampharetids	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	+	-	-	-	+	+	+	-	-	-	*	-	-	-	-	-
Apistobranchus ornatus	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capitomastus sp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glycera branchiopoda	.	.	.	.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Laonice spp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-
Nephtys punctata	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Onuphis spp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
sabellid	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Autolytus sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Lepidonotus caelorus	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Notomastus magnus	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polydora ? spongicola	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potamethus mucronatus or P. sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-
Thelepus setosus	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anobothrus gracilis	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amage anops or A. sp.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-
Ancistrosyllis sp.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ceratocephale l. pacifica	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidasthenia virens	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melinnexis pacificus	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Spiophanes pallidus	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphicteis mucronata	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brada pilosa	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Califia calida	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-
Cirratulus ?cirratus, anoculate	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphrosine sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lagisca sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	+	-	-	-	+	-	-	-	-	-
Leaena caeca	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Lumbriclymene sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cirratulid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
harmothoid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Paraonis g. oculata or P. sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	-	+	+	-	-	+	-	-	+	+	-	-	+	+
Pista sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aglaophamus erectans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leiochrides sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	+	+	-	+	+	-	-	-	-	-	-	-	-
flabelligerid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaetozone sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Melinna sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
?Nicomache sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Typosyllis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Aedicirra ramosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-
Protis pacifica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	*	+	+	+	-	-	+
hesionid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-
Naineris nr. quadricuspida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-
pisionid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-
terebellid, with spiculed tube	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-
Lumbriclymene lineus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-

Polychaeta in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Spiophanes ?anoculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	+	–	–	–	–
myriochelliid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
Thelepus setosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–
Antinoella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+
Myxicola ?infundibulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–
Asclerocheilus californicus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–

Echinodermata in the San Pedro slope and sill, showing order of occurrence in 60 to 466 fms.

Amphiacantha amphacantha	+	–	+	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphiodia occidentalis	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphiodia psara	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphiodia rugosa	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphiodia urtica	*	+	*	*	–	+	+	+	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphioplus strongyloplax	*	–	+	+	–	+	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphipholis squamata	*	–	*	+	+	–	–	–	–	+	–	+	–	+	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphiura arcystata	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–
Amphiura seminuda	+	–	–	–	–	–	–	–	–	–	–	–	–	+	–	+	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–
Leptosynapta albicans	+	–	+	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Echinodermata in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
sea star	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pachythyone rubra	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brisaster townsendi	.	.	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brissopsis pacifica	.	.	+	-	-	+	+	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphioplus hexacanthus	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molpadia intermedia	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphipholis pugetana	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	+	-	-	-	-	-
Cryptopeltaster lepidonotus	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Florometra perplexa	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Henricia sp.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odontaster crassus	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiacantha diplasia	.	.	.	+	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Ophiacantha phragma	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiopholis bakeri	.	.	.	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiothrix spiculata	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rathbunaster californicus	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allocentrotus fragilis	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ophiuroid	.	.	.	.	+	-	-	-	-	-	-	-	-	+	+	-	+	-	-	-	+	-	-	+	-	-	-	-	+	+	+
Gorgonocephalus caryi	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Echinodermata in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Leptychaster (P.) pacificus	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Luidiaster californicus	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Psolus sp.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Stylasterias forreri	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Amphiodia digitata	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
holothurian	.	.	.	.	.	.	+	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Gonimaretia laevis	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ophiocynodus corynetes	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	+	–	–	–	–	–	+	–	+	–	–	–	–	–	–
Ophiomusium jolliensis	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	+	+	–	+	–	–	–	+	–	–	–	–	–	–	–	–
Ophiura kofoidi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ophiacantha rhachophora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–
Ophiacantha sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–
Ophiura leptoctenia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–
Myxoderma platyacantha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–
Ophiacantha paucispina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–
Benthopecten acanthonotus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–

Mollusca in the San Pedro slope and sill, showing order of occurrence in 60 to 466 fms.

	1	2	3	4	5	6	7	8	9	10	11	12	13,14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Acteocina culcitella	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Adontorhina cyclia	*	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aligena sp.	*	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amygdalum pallidulum	+	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadulus sp.	+	-	-	-	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Cuspidaria apodema	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyclopecten vancouverensis	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lima dehiscens	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nemocardium centrifilosum	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nucula carlottensis	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuculana taphria	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
solenogasters or Crystallophrisson	+	-	+	+	+	-	+	-	-	+	-	-	-	+	-	-	+	-	+	+	-	+	+	+	+	+	+	+	-	-
Tellina carpenteri	+	+	*	-	-	-	-	*	*	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbonilla sp.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volvulella tenuissima	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antiplanes ?perversa	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erycina chacei	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solariella sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Axinopsida serricata	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mollusca in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Balcis rutila	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bittium sp.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cardita ventricosa	.	.	+	+	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Linga sp.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nucula sp.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Parvilucina tenuisculpta	.	.	+	–	–	–	–	–	–	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Poromya sp.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pseudopythina chacei	.	.	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
gastropods	.	.	+	–	+	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
pelecypods	.	.	+	–	+	–	*	–	–	–	–	–	+	–	+	+	+	–	–	+	–	–	–	*	+	–	+	+	–	+	+
scaphopods	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–
Cardita sp.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Crystallophrisson marinelli	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Saxicavella arctica	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cadulus tolmiei	.	.	.	.	.	.	+	+	*	–	–	+	+	+	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–
dorid slug	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Limifossor fratula	.	.	.	.	.	.	+	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bittium catalinensis	.	.	.	.	.	.	.	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Crenella sp.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Mollusca in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cyrilla munita	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Protochaetoderma californica	.	.	.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	+
Amphissa bicolor	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crenella decussata	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuculana conceptionis	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuculana minuta	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuculana hamata	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crystallophrisson recisum	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
?Macoma sp.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitidella permodesta	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	+	-	+	-
Tellina sp.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Admete californica	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aglaja sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Borsonella dalli	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Siliqua sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crystallophrisson hartmani	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
Crystallophrisson rectum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crystallophrisson hancocki	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Dacrydium pacificum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-

Mollusca in San Pedro slope and sill (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Dentalium rectius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Thyasira sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
?*Mitrella* sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–	–
?*Natica clausa*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–	–
Cardiomya pectinata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–	–	–	–	–
chiton	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	–	–	–	–

NEWPORT SHELF

The narrow Newport Shelf (NE) has its shoreward end between Newport Bay and Laguna Beach; it is bounded on the west by Newport canyon (Hartman, 1963, 27) and merges oceanward and in greater depth with the San Pedro slope (see Map 1). Sediments of the bottom are sand and silt mixed with varying amounts of shelly and other biological debris. Faunal diversity changes with location, depth and size of sample, as shown by the following analysis:

Sta. no.	Depth in fms.	Size of sample in cuft	No. of species	No. of specimens
2745	8	0.27	47	190
5877	9	0.69	59	306
4777	10	0.88	70	437
4871	27	1.32	101	701
5354	31	1.51	82	1250
5092	50	1.51	78	1134
4872	52	3.30	61	540

Most of the benthic animals of this shelf are infaunal and thus not visible in surface views except as pores, small mounds or extended parts of animals. Eight samples are analyzed, with three of the major groups of species named on the following chart. Greater depths than 52 fms are referred to the San Pedro slope area.

1. Sta. 2745 (no. 110). 0.1 mi from end of Balboa pier, in 8 fms. OPG took 0.27 cuft of gray sand and shelly fragments and numerous branches of *Cellaria* (bryozoans). In addition to those named on the chart, *Harenactis* sp. (28), a nemertean (3), amphipods (45), a caprellid (1), cumaceans (14), ostracods (5) and a small crab (6), were present. The largest species were *Diopatra ornata* and *Chaetopterus variopedatus*. None was outstandingly abundant.

Numbers of species and specimens totalled:

polychaetes	34 species,	77 specimens
echinoderms	3	3
mollusks	3	7
crustaceans	5+	71
others	4	32+
Total:	49+ species,	190+ specimens

2. Sta. 4877 (no. 134). About half way between Newport Bay and Laguna Beach, in 9 fms. OPG took 0.69 cuft of medium dark gray sand. Wet weight of macroscopic animals was 19.9 grams, of which polychaetes comprised 10.7, ophiuroids 4, *Astropecten* (2) 1.7, nemerteans 1.4, and anemones 1.3 grams. In addition to the species named on the chart, a white anemone with flat base (8), small anemone (8), *Cerebratulus* sp. (2), a polyclad (2), a sipunculid (15), about ten species of amphipods (107), an isopod (1), cumaceans with six species (18), ostracods with four (18), a shrimp (1), and *Branchiostoma* sp. (3), comprised the lot. The largest individual was *Nothria iridescens*, the most conspicuous *Owenia f. collaris* and *Onuphis eremita*, and the most abundant *Lumbrineris cruzensis* (25) and *Glycera oxycephala* (21).

Numbers of species and specimens totalled:

polychaetes	25	species,	101	specimens
echinoderms	4		33	
mollusk	1		1	
crustaceans	23		133	
others	6		38	
Total:	59	species,	306	specimens

3. Sta. 4777 (near no. 185). S of Laguna Beach, in 10 fms. OPG took 0.88 cuft of fine gray to black sand, flocculent debris having an odor of hydrogen sulfide, and many animals. Total wet weight of animals was 21.2 grams, of which polychaetes comprised 12.4, mollusks 4.6, an *Astropecten* 2.0, and crustaceans 1.0 grams. In addition to those listed on the chart, the sample had two kinds of nemerteans (18), *Glottidia albida* (2), 18 species of amphipods (284), a tanaid (23), two kinds of cumaceans (6), an epinebalian (1), an ostracod (2), *Callianassa* (3), a pagurid (1) and a crab (4). Largest individuals were *Astropecten* and *Lytechinus*; and most conspicuous was *Diopatra ornata*.

Numbers of species and specimens totalled:

polychaetes	26	species,	75	specimens
echinoderms	3		7	
mollusks	8		11	
crustaceans	30		324	
others	3		20	
Total:	70	species,	437	specimens

4. Sta. 4871 (near no. 185). 2.7 mi from Dana Pt., in 27 fms. OPG took 1.32 cuft of green silt. Wet weights of animals totalled 54.5 grams, of which polychaetes comprised 22.2, ophiuroids 19.6, tunicates

5.7, mollusks 2.8, and decapods 1.8 grams. In addition to the species named on the chart, the lot comprised a small sea-whip, a hydroid stalk, several small nemerteans, many slender tubes of phoronids, 16 kinds of amphipods (115), an isopod, a tanaid, two kinds of cumaceans (3), three kinds of ostracods (40), *Callianassa* sp. (4), *Pinnixa* sp. (4), *Randallia* sp. (1), *Scalpellum* (1), a pycnogonid (1), an enteropneust (5) and a tunicate (2). There was no conspicuously large specimen; most abundant were *Amphiodia urtica* (240) and *Pectinaria californiensis* (40).

Numbers of species and specimens totalled:

polychaetes	35 species,	175 specimens
echinoderms	8	267
mollusks	21	56
crustaceans	32	173
others	5	30+
Total:	101 species,	701+ specimens

5. Sta. 2747 (near no. 134). Between Newport Bay and Laguna Beach, in 30 fms. Biological dredge took a small sample in kelp and sandy bottom. The most conspicuous species were *Pectinaria californiensis* and *Platynereis bicanaliculata.*

6. Sta. 5354 (near no. 185). 7.5 mi from Newport jetty light, in 31 fms. OPG took 1.51 cuft of green sandy silt with many animals. Wet weights totalled 88.9 grams, of which ophiuroids comprised 57.5, polychaetes 17.5, holothurians 10.8, nemerteans 1.2, and others less than a gram. In addition to the species named on the chart, there were present a ceriantharian (3), a broad white polyclad (1) and another with encircling black eyes (1), nemerteans (12), a phoronid (10), 11 kinds of amphipods (106), two cumaceans (2), four ostracods (99), two pinnixid crabs (5), and an enteropneust (5). Largest individuals were *Molpadia intermedia* and *Travisia pupa.* Most abundant were *Amphiodia urtica* (595), *Pholoe glabra* (112), *Lumbrineris cruzensis* (38) and *Pectinaria californiensis* (30).

Numbers of species and specimens totalled:

polychaetes	41 species,	358 specimens
echinoderms	5	618
mollusks	10	29
crustaceans	19	213
others	7	32
Total:	82 species,	1250 specimens

7. Sta. 5092 (near no. 185). 1.4 mi from Newport jetty light, in 52 fms. OPG took 3.3 cuft of sand and shell fragments. Wet weight was 131.4 grams, of which ophiuroids comprised 69.2, *Molpadia* 32.5, polychaetes 25.2, echiuroids 2.6, mollusks 1, and others less than 1 gram. In addition to the species listed on the chart, the lot contained a small white anemone (1), ?*Harenactis* sp. (1), *Monobrachium parasitum* colonies (6), a polyclad (1), nemerteans (5), sipunculid (1), *Arynchite* (1), 11 kinds of amphipods (151), two kinds of isopods (3), ostracods (4), two cumaceans (4), and small colonies of *Pyrosoma* (5). Largest individuals were *Molpadia intermedia* and *Travisia pupa*, and most abundant was *Amphiodia urtica* (648), followed by *Amphipholis squamata* (72) and *Pectinaria californiensis* (36).

Numbers of species and specimens totalled:

polychaetes	34 species,	161 specimens
echinoderms	7	747
mollusks	12	42
crustaceans	17	162
others	8	20
Total:	78 species,	1132 specimens

8. Sta. 4878 (near no. 185). 1.4 mi from Newport jetty light, in 52 fms. OPG took 3.3 cuft of sand and shell fragments. Wet weights totalled 58.4 grams, of which polychaetes were 36.5, ophiuroids 15.6, mollusks 2.8, nemerteans 1.1, and others each less than 1 gram. In addition to the species named on the chart, the sample contained a small seawhip, ?*Harenactis* (3), *Listriolobus pelodes* (9), eight kinds of amphipods (50), an isopod (2), an ostracod (2), a pinnotherid crab (2), a small crab (1), and an enteropneust (3). Largest individual was *Pista disjuncta*, and most abundant species were *Amphiodia urtica* (252), *Pectinaria californiensis* (43), and *Pista disjuncta* (20).

Numbers of species and specimens totalled:

polychaetes	31 species,	168 specimens
echinoderms	4	277
mollusks	9	17
crustaceans	12	57
others	5	21
Total:	61 species,	540 specimens

Polychaeta in the Newport shelf,
showing order of occurrence in 8 to 52 fms.
+ indicates presence, - absence.
Species represented by more than 10 specimens are indicated by *.

	1	2	3	4	5	6	7	8
Amaeana occidentalis	+	-	-	+	-	-	-	+
Anaitides sp.	+	-	+	-	-	-	-	-
Aricidea lopezi	+	-	-	-	-	+	-	-
Aricidea neosuecica	+	+	-	-	-	-	-	+
Chaetopterus variopedatus	+	-	-	-	-	-	-	-
Chaetozone corona	+	-	+	-	-	-	-	-
Diopatra ornata	+	-	*	-	-	-	-	-
Glycera convoluta	+	+	+	-	-	-	-	-
Goniada littorea	+	-	+	-	-	-	-	-
Gyptis a. glabra	+	-	+	-	-	+	-	+
Haploscoloplos elongatus	+	+	-	-	-	+	-	-
Harmothoe lunulata	+	+	-	-	-	-	-	-
Harmothoe priops	+	-	-	-	-	-	-	-
Heterospio catalinensis	+	-	-	-	-	-	-	-
Laonice cirrata	+	-	-	+	-	-	+	+
Lumbrineris spp.	+	-	-	+	-	-	-	-
Magelona sacculata	+	+	+	-	-	-	-	-
Mediomastus californiensis	+	-	-	-	-	+	-	-
Nephtys spp.	+	-	-	-	+	-	-	-
Nereis procera	+	-	-	-	-	-	-	-
Nothria iridescens	+	*	+	-	-	-	-	-
Odontosyllis phosphorea	+	-	-	-	-	-	-	-
Owenia f. collaris	+	+	-	-	-	-	-	-
Pareulepis fimbriata	+	-	-	-	-	-	-	-
Phyllochaetopterus limicolus	+	-	-	-	-	-	-	-
Prionospio malmgreni	+	-	+	-	-	*	+	+
Sthenelais tertiaglabra	+	-	-	-	-	-	-	-
syllid	+	-	-	-	-	-	-	-
Telepsavus costarum	+	-	-	+	-	+	+	-

Polychaeta in Newport shelf (continued)

	1	2	3	4	5	6	7	8
Thalenessa spinosa	+	+	+	–	–	–	–	–
Tharyx spp.	*	+	–	+	–	–	+	+
Exogone uniformis		+	+	–	–	–	–	–
Glycera oxycephala		*	–	–	–	–	–	–
Glycinde armigera		+	*	–	–	–	–	–
Goniada brunnea		+	–	–	–	+	+	+
Loimia medusa		+	–	–	–	–	–	–
Lumbrineris nr. acuta		+	–	–	–	–	–	–
Lumbrineris californiensis		+	–	+	–	+	–	–
Lumbrineris cruzensis		*	–	–	–	*	*	+
Nephtys caecoides		+	+	–	–	–	–	–
Onuphis eremita		*	–	–	–	–	–	–
Pholoe glabra		+	–	+	–	*	*	*
Pista disjuncta		+	–	+	–	–	+	*
Prionospio pinnata		+	+	+	–	+	+	+
Prionospio, another sp.		+	–	–	–	–	–	–
Rhynchospio sp.		+	–	–	–	–	–	–
Spiophanes missionensis		+	–	–	–	+	+	–
Amphicteis scaphobranchiata			+	–	–	+	+	–
Axiothella rubrocincta			+	–	–	+	+	–
Brada pilosa			+	–	–	–	–	–
Glycera americana			+	+	+	–	–	+
Harmothoe sp.			+	–	–	–	–	–
Pherusa neopapillata			+	+	–	–	–	–
Pista cf. cristata			+	–	–	–	–	–
Platynereis bicanaliculata			+	–	+	–	–	–
Poecilochaetus johnsoni			+	+	–	+	–	–
Pseudopotamilla occelata			+	–	–	–	–	–
Schistocomus hiltoni			+	–	–	–	–	–
Tharyx multifilis			+	–	–	–	–	–
Ancistrosyllis tentaculata				+	–	–	+	+

Polychaeta in Newport shelf (continued)

	1	2	3	4	5	6	7	8
Anotomastus gordiodes				+	-	-	-	-
Aricidea sp.				+	-	-	-	-
Artacamella hancocki				+	-	-	-	-
Brada glabra				+	-	-	-	-
Ceratocephala c. americana				+	-	+	+	+
Cossura candida				*	-	*	+	-
Glycera capitata				+	-	-	+	+
Loandalia fauveli				+	-	+	-	-
Magelona pacifica				*	-	-	+	-
Myriowenia californiensis				+	-	-	-	-
Naineris uncinata				+	-	-	-	-
Paraonis gracilis				+	-	+	+	+
Pectinaria californiensis				*	+	*	*	*
Pilargis berkeleyi				+	-	+	-	-
Polydora sp.				+	-	-	-	-
Praxillella a. pacifica				+	-	-	-	-
Rhodine bitorquata				+	-	+	-	-
Sternaspis fossor				*	+	+	+	+
Sthenelanella uniformis				+	-	-	-	-
Terebellides stroemii				+	+	*	-	+
ampharetid					+	-	-	+
Asabellides ?lineata or A. sp.					+	+	-	-
Hyalinoecia juvenalis					+	-	-	-
Isocirrus longiceps					+	-	-	-
Notomastus magnus					+	-	-	-
Pherusa capulata					+	-	-	-
Travisia sp.					+	+	-	-
Anaitides, checkered						+	-	-
Ancistrosyllis cf. rigida						*	-	-
Aricidea uschakowi						+	+	-
Chloeia pinnata						+	+	*

Polychaeta in Newport shelf (continued)

	1	2	3	4	5	6	7	8
Drilonereis sp.						+	-	-
Eunice americana						+	-	-
Hesperonoe sp.						+	+	-
Nephtys ferruginea						+	+	+
Notomastus tenuis						+	-	-
Praxillella gracilis						+	+	+
Spio punctata						+	-	-
Travisia pupa						+	+	-
Brada pluribranchiata							+	+
Chone gracilis							+	-
Leanira sp.							+	-
Lumbrineris bifilaris							+	-
Megalomma sp.							+	-
Myriochele gracilis							+	-
Onuphis parva							+	-
Lepidasthenia sp.								+
Lumbrineris bicirrata								+
Ninoe gemmea								+
Panthalis pacifica								+
Travisia brevis								+

Echinodermata in the Newport shelf, showing order of occurrence in 8 to 52 fms.

Amphiodia psara	+	-	-	-	-	-	-	-
Amphiodia urtica	+	*	-	*	-	*	*	*
Astropecten californicus	+	+	-	+	-	-	-	-
Amphipholis squamata		*	-	*	-	+	*	*
Dendraster excentricus		+	-	-	-	-	-	-
Amphiodia digitata			+	-	-	-	-	-
Astropecten sp.			+	-	-	-	-	-
Lytechinus anamesus			+	+	-	-	-	-
Amphiura arcystata				+	-	-	-	+

Echinodermata in Newport shelf (continued)

	1	2	3	4	5	6	7	8
Ophiothrix spiculata				+	-	-	-	-
Ophiura lutkeni				+	-	-	-	-
Pentamera pseudopopulifera				+	-	-	-	-
Amphioplus strongyloplax						*	*	+
Leptosynapta albicans						+	-	-
Molpadia intermedia						+	+	-
Amphiacantha amphacantha							+	-
holothurian							+	-

Mollusca in the Newport shelf,
showing order of occurrence in 8 to 52 fms.

Epitonium tinctum	+	-	-	-	-	-	-	-
Rochefortia tumida	+	-	-	-	-	-	-	-
Turbonilla sp.	+	-	-	-	-	-	-	-
Olivella baetica		+	-	-	-	-	-	-
Crepidula excavata			+	-	-	-	-	-
?Lacuna sp.			+	-	-	-	-	-
Nassarius perpinguis			+	+	-	+	-	-
Nitidella carinata			+	+	-	-	-	-
Olivella ?pedroana			+	-	-	-	-	-
Polinices lewisii			+	-	-	-	-	-
Solen ?sicarius			+	-	-	-	-	-
Tellina modesta			+	-	-	-	-	-
Acteocina intermedia				+	-	-	-	-
Axinopsida serricata				+	-	+	+	+
Bittium sp.				+	-	-	-	-
Cadulus sp.				+	-	-	+	-
Compsomyax subdiaphana				+	-	+	-	+
Crenella columbiana				+	-	-	-	-
Cylichna diegensis				+	-	-	-	+
Lyonsia californica				+	-	-	-	-
Macoma yoldiformis				+	-	-	-	-

Mollusca in Newport shelf (continued)

	1	2	3	4	5	6	7	8
Mangelia sp.				+	-	-	+	-
Megasurcula ?carpenteriana				+	-	-	-	-
Modiolus sp.				+	-	-	-	-
Nuculana taphria				+	-	-	-	-
Pandora sp.				+	-	-	-	-
?Rochefortia sp.				+	-	-	-	-
Saxicavella pacifica				+	-	-	-	-
solenogasters				+	-	+	+	+
Thyasira sp.				+	-	-	-	-
Volvulella tenuissima				+	-	+	+	+
Cylichna attonsa						+	+	-
Epitonium sp.						+	-	-
Nucula tenuis						+	+	-
Pandora bilirata						+	-	-
Rochefortia aleutica						+	*	-
Adontorhina cyclia							+	-
?Macoma sp.							+	-
Pseudopythina chacei							+	-
?Turbonilla sp.							+	-
Balcis sp.								+
Cardita ventricosa								+
Cuspidaria sp.								+
Saxicavella pacifica								+

SUBMERGED SEA MOUNTS IN THE SAN PEDRO CHANNEL

Two sea mounts (LS) in the San Pedro Channel have been biologically explored. The larger Lasuen sea mount is on the eastern and the smaller Sixmile bank on the western side of the channel (see Map 1).

The Lasuen sea mount is located 13 nautical miles west of Newport and beyond the outer end of Newport Canyon; its base is in depths of about 250 fms and it rises to 40 to 68 fms at its top. It measures about 3.25 by 5.33 miles and covers more than 16 square miles. Six samples were recovered and analyzed. The sediments at the top are rocky, calcareous, with much debris; downward the sediments contain much shelly debris, mucoid stringy masses, flocculent debris; this gives way farther down to gravelly debris and then sandy green mud. Siliceous sponge occurs at its deepest perimeter. The faunal components are richly diversified; the most abundant and largest are echinoderms, coelenterates, mollusks, polychaetes and crustaceans.

1. Sta. 2298 (no. 235). SW end of sea mount, in 68 fms. OPG took 0.37 cuft of shelly sand and a few rocks. In addition to the species listed on the chart, there were single individuals of anemone, nemertean, sipunculid (2), oligochaete (1), and crustaceans (amphipods and isopods) in sparse numbers. Largest individual was *Lanice conchilega*, and most abundant species were *Spio punctata* (148), and *Chloeia pinnata* (16).

Numbers of species and specimens totalled:

polychaetes	33 species,	254 specimens
echinoderms	4	12
mollusks	3	3
crustaceans	2+	2+
others	4	14
Total:	46+ species,	285+ specimens

2. Sta. 2297 (no. 236). Southeast end of Lasuen sea mount, in 181 fms. OPG took 0.68 cuft of large and small rocks, mud, gravelly debris, with many small animals and a large brown, coarse sponge measuring 3 by 5 cm. In addition to those named on the chart, there were also a sipunculid (2), an amphipod (2), a caprellid (1), and a tanaid (3). None was abundant, and most were under-developed. Total number of species was estimated at less than 30, and specimens numbered about 50.

3. Sta. 2843 (no. 220). Northern end of Lasuen sea mount, in 230 fms. OPG took 1.32 cuft of grayish green sandy mud with little rubble and numerous animals. The lot included a small sea-whip, a nemertean (2 large), amphipods (few), an isopod (1), a cumacean (1), ostracods (3). Largest individual was *Brissopsis pacifica* and most abundant were *Nuculana conceptionis* (16), and *Lysippe annectens* (15).

Numbers of species and specimens totalled:

polychaetes	20 species,	46 specimens
echinoderm	1	5
mollusks	8+	41
crustaceans	5+	7+
others	2	3
Total:	36+ species,	102+ specimens

4. Sta. 2887 (no. 221). Northeast end of Lasuen sea mount, in 284 fms. OPG took 2.89 cuft of gray-green mud with many foraminiferans and small animals of few kinds. In addition to those listed on the chart, an amphipod (3) and a cumacean (2) were present. Largest was a brissopsid, and most abundant *Nitidella permodesta* (13). Most of the species are those characteristic of slope depths.

5. Sta. 2299 (no. 234). Southwest end of Lasuen sea mount, in 360 fms. OPG took a full sample of dark gray oozy mud with siliceous sponge and many kinds of animals. In addition to those listed, there were present a nemertean (1), and a sipunculid (1). Largest individuals were *Thalanessa spinosa* and *Maldane sarsi*. None was conspicuously abundant. Number of species totalled about 16, and specimens less than 20.

6. Sta. 2154-52 (near 228). Lasuen sea mount, in 300 fms. Biological dredge, with tangles, pulling upslope on a rocky incline, recovered coarse brown sponge, an alcyonarian, bryozoans encrusting rocks, a galatheid crab, and those species listed on the chart. Most, if not all, are unique to this area, and may have their affinities with animals off the deeper areas of Santa Catalina Island.

Sixmile bank is a broadly elongate seamount, 6.5 nautical miles northeast of Avalon, Santa Catalina Island; it rises from a depth of 350 fms to a flat top in 228 fms. It measures about 3.25 by 4.5 mi and covers an area of about 15 square miles. It is located in the serial numbers 213, 214 and 228, 229. Three samples were useful to indicate the kind of fauna.

Sta. 2204 (near no. 228), in 230 fms, was a dredged one and took rocks with attached ophiuroid, *Ophiacantha phragma*, asteroids, and

Psolus, also egg-capsules of a hag-fish, a chiton, a munnid crab, horny brown sponges and associated bryozoans and polychaetes. The polychaetes appear to be largely unknown species in the genera *Euchone, Euphrosine, Exogone, Glycera, Lagisca, Lumbrineris, Odontosyllis* and *Thelepus.*

Sta. 2845 (no. 229), in 227 fms. OPG took 1.25 cuft of grayish green sandy mud with small mud-balls, dark gravel, and wormlike animals. Largest individuals were a nemertean, *Cerabratulus*, a capitellid, and a brissopsid, *Brissopsis pacifica.* Polychaetes included species in *Ammotrypane*, ampharetids, capitellid, cirratulid, *Cirrophorus furcatus, Haploscoloplos elongatus, Laonice* sp., *Onuphis* sp., *Streblosoma* sp. and *Terebellides stroemii.* Mollusks were represented by *Cadulus tolmiei* and solenogasters, and crustaceans by amphipods and an apseudid isopod.

Sta. 2228 (no. 228) in 293 fms. OPG took oozy mud with siliceous sponge, orbicular foraminiferans, and metazoan animals including ophiuroids, gastropods, pelecypods, scaphopods, solenogasters, together with more numerous small polychaetes and crustaceans (see Hartman, 1955: 136).

Polychaeta from Lasuen sea mount (1-5) and Sixmile bank (6)
showing order of occurrence in 68 to 360 fms.
+ indicates presence, - absence.
Species represented by more than 10 specimens are indicated by *.

	1	2	3	4	5	6
Anaitides ?madeirensis	+	+	-	-	-	-
Anobothrus gracilis	+	-	-	-	-	-
Capitella capitata subsp.	+	-	-	-	-	-
Chaetozone armata	+	-	-	-	-	-
Chloeia pinnata	+	-	+	-	-	-
Euchone incolor	*	-	-	-	-	-
Exogone uniformis	+	-	-	-	-	-
Glycera americana	+	-	-	-	-	-
Glycera cf. capitata	+	-	-	-	-	-
hesionid, unknown	+	-	-	-	-	-
Lanice conchilega	+	-	-	-	-	-
Laonice cirrata	+	-	-	-	-	-
Lumbrineris latreilli	+	-	-	-	-	-
Lumbrineris spp.	+	+	-	-	-	-
Lysippe annectens	+	-	*	-	-	-
Magelona ?californica	+	-	-	-	-	-
Magelona pacifica	*	-	-	-	-	-
Nephtys, unknown sp.	+	-	-	-	-	-
Notomastus lineatus	+	-	-	-	-	-
Notomastus magnus	+	-	-	-	-	-
Onuphis sp.	+	-	-	-	-	-
Peisidice aspera	+	-	-	-	-	-
phyllodocid	+	-	-	-	-	-
Polycirrus sp.	+	+	-	-	-	-
Polydora cf. websteri	*	-	-	-	-	-
Prionospio pinnata	+	-	-	-	-	-
Protodorvillea gracilis	+	-	-	-	-	-
Questa caudicirra n. gen., n. sp.	+	-	-	-	-	-
Sphaerosyllis sp.	+	-	-	-	-	-

Polychaeta from Lasuen sea mount and Sixmile bank (continued)

	1	2	3	4	5	6
Spio punctata	*	-	-	-	+	-
Thalenessa spinosa	+	-	-	-	-	+
Tharyx tesselata	+	-	-	-	-	-
?Typosyllis sp.	+	-	-	-	-	-
Aricidea spp.		+	-	-	-	-
Boccardia sp.		+	-	-	-	-
Brada glabra		+	+	-	-	-
capitellid		+	-	-	-	-
Cossura candida		+	-	-	-	-
Dodecaceria concharum		+	-	-	-	-
Eunice sp.		+	-	-	-	-
Glycera sp.		+	-	-	-	-
Haploscoloplos elongatus		+	+	-	-	-
Lepidonotus caelorus		+	-	-	-	-
maldanid		+	-	-	-	-
Phyllochaetopterus limicolus		+	+	-	-	-
syllid		+	-	-	-	-
Terebellides stroemii		+	-	-	-	-
unknown annelid		+	-	-	-	-
Ammotrypane aulogaster			+	-	-	-
Anaitides sp.			+	-	-	-
Cirrophorus aciculatus			+	-	-	-
Cirrophorus furcatus			+	-	-	-
Drilonereis ?longa			+	-	-	-
Goniada brunnea			+	-	-	-
Gyptis a. glabra			+	-	-	-
Myriochele sp.			+	-	+	-
Nephtys ?ferruginea			+	-	-	-
Paraonis gracilis			+	-	+	-
Potamethus sp.			+	-	-	-
Praxillella a. pacifica			+	-	-	-

Polychaeta from Lasuen sea mount and Sixmile bank (continued)

	1	2	3	4	5	6
Prionospio sp.			+	–	–	–
Tharyx sp.			+	–	+	–
Aglaophamus sp.				+	–	–
Ammotrypane sp.				+	–	–
Aricidea lopezi				+	–	–
Caulleriella sp.				+	–	–
goniadid				+	–	–
Ancistrosyllis sp.					+	–
Eumida sp.					+	–
Glycera branchiopoda					+	–
Maldane sarsi					+	–
Notomastus sp.					+	–
Gattyana brunnea n. sp.						+
Glycera tesselata						+
Lagisca nr. multisetosa						+
Lepidonotus caelorus						+
Macellicephala remigata						+
?Nicomache, unknown						+
serpulid fragment						+
terebellid, unknown						+

Echinodermata from Lasuen sea mount (1-5) and Sixmile bank (6) showing order of occurrence in 68 to 360 fms.

Amphiacantha amphacantha	+	–	–	–	–	–
Amphiodia urtica	+	+	–	–	–	–
Amphipholis squamata	+	–	–	–	–	–
Leptosynapta albicans	+	–	–	–	–	–
Spatangus californicus	+	–	–	–	–	–
Amphioplus strongyloplax		+	–	–	–	–
Amphipholis pugetana		+	–	–	–	+
Ophiothrix spiculata		+	–	–	–	–

Echinodermata from Lasuen sea mount and Sixmile bank (continued)

	1	2	3	4	5	6
Brissopsis pacifica			+	-	-	-
brissopsids				+	-	-
ophiuroid					+	-
echinoid					+	-
Allocentrotus fragilis						+
Amphiura seminuda						+
Astrophiura marionae						+
Luidiaster californicus						+
Ophiacantha bairdi						+
Ophiacantha diplasia						+
Ophiocynodus corynetes						+
Ophiopholis bakeri						+

Mollusca from Lasuen sea mount (1-5) and Sixmile bank (6) showing order of occurrence in 68 to 360 fms.

Glycimeris subobsoleta	+	-	-	-	-	-
Parvilucina tenuisculpta	+	-	+	-	-	-
Tellina carpenteri	+	-	+	-	-	-
Cadulus tolmiei		+	*	-	-	-
Lepidopleurus nexus		+	-	-	-	-
Limifossor sp.		+	-	-	-	-
Saxicava arctica		+	-	-	-	-
Cardita sp.			+	-	-	-
Nuculana conceptionis			*	-	-	-
Nuculana hamata			+	-	-	-
Solamen columbianum			+	-	-	-
solenogasters			+	-	+	-
Dacrydium sp.				+	-	-
Nitidella permodesta				*	-	-
Saxicavella pacifica				+	-	-

SANTA CATALINA ISLAND, LEEWARD SIDE

The leeward side of Santa Catalina Island (CL) has been sampled on many occasions. Quantitative grab samples noted below were taken along transects extending from East End, Avalon, Willow Cove, White Cove-Long Point, Isthmus Cove, Howlands Landing, and West End, leeward side. The details of kinds and abundance of animals are indicated on the separate charts (below).

East End

1. Sta. 3611 (no. 259), in 30 fms. OPG took 0.56 cuft of green mud, sand, strands of algae (*Egregia*) measuring to 11 feet long, and many animals, especially amphipods, red-striped spirontocarid shrimps, polychaetes, echinoderms and coelenterates. Polyclads, nemerteans and sipunculids were occasional. Encrusting bryozoans on kelps were varied. The most conspicuous animals were *Ophiothrix spiculata, Chaetopterus variopedatus* and *Platynereis bicanaliculata*; most abundant were amphipods and *Capitella capitata* subspp. Total number of species was more than 50.

2. Sta. 5095 (near no. 259), in 40 fms. OPG took 0.81 cuft of fine greenish brown sand. Largest individual was a red nemertean, *Lepidasthenia ?virens*, and most conspicuous was *Sternaspis fossor. Amphiodia urtica* was most abundant, with 186 specimens. Other animals than those shown on the chart included an anemone, three each of ceriantharians and enteropneusts, and numerous small *Pyrosoma.*

The number of species and specimens totalled:

polychaetes	17+ species,	116+ specimens
echinoderms	6	226
mollusks	6	13
crustaceans	17	45
others	5	9+
Total:	51+ species,	409+ specimens

3. Sta. 2122 (no. 259), in 48 fms. OPG took 0.95 cuft of sandy mud with dead *Laqueus* and other brachiopod shells, and living animals. The largest were a ceriantharian anemone, and a nemertean. Crustaceans were numerous, with ostracods, amphipods, cumaceans, isopods.

4. Sta. 3613 (near no. 259), in 50 fms. OPG took 0.31 cuft of glauconitic sand and white shelly debris, with many animals. Kelps were absent and there was no large or conspicuous animal. Most abundant was *Nothria elegans*, with 145+ specimens, followed by *Chaetozone setosa* with 68, and *Amphiodia urtica* with 50. The polychaetes were followed

in diversity and abundance by small crustaceans, especially amphipods, ostracods and cumaceans.

5. Sta. 4045 (near no. 259), in 57 fms. OPG took about 2 liters of sandy debris with stony hydrocoral skeletons, broken shells, a large brissopsid and many animals. The largest individual was *Spatangus californicus*, which measured 46 mm in diameter. Most conspicuous were *Amphiodia digitata*, with 43 individuals, and a large *Thelepus setosus*. Shells of *Bittium* (snail) had hydranth colonies. Crustaceans were small, included a pagurid, cumaceans, amphipods, isopods and ostracods.

6. Sta. 3615 (near no. 259), in 60 fms. OPG took 0.63 cuft of green shelly sand, with rock, white coralline rubble, and much diversified life. In addition to those animals listed in the chart, the sample contained a small amount of sponge, a solitary coral, sand covered anemones, a smooth brown-spotted anemone, a nemertean, and a sipunculid. Crustaceans included many amphipods, at least four kinds of isopods, 50 or more ostracods, crabs with eight pagurids, ten dromiids, a spider, and another crab. The most conspicuous animals were echinoderms: *Brissopsis pacifica* (4), *Lovenia californicus* (2), and *Amphipholis squamata* (21). The most abundant and diversified were polychaetes.

7. Sta. 2348 (near no. 260), in 75 fms. OPG took gray-green sand, rock, coralline and shelly rubble, with few living animals. The most abundant animal was *Nothria stigmatis*, with more than 100 specimens. Most conspicuous were two brissopsids, small ophiuroids, and a holothurian.

8. Sta. 3616 (near no. 260), in 88 fms. OPG took 0.18 cuft of glauconitic white shelly sand and rubble with trace of siliceous sponge. The screenings retained no large animal but numerous small ones, with polychaetes the most abundant and diversified. The most conspicuous was *Chloeia pinnata* (25). Amphipods were numerous and diversified, followed by ostracods, isopods, small crabs, and a pagurid, with six individuals, in dead shells of *Nassarius*.

9. Sta. 3617 (near no. 260), in 93 fms. OPG took white coralline sand and silt, the sand compacted but friable. The largest animals were single individuals of *Brissopsis pacifica* and *Brisaster townsendi*; most abundant were species of *Tharyx*, *Nothria elegans*, and amphipods.

Avalon Harbor

1. Sta. 3601 (near no. 239), in 18 fms. OPG took 0.69 cuft of gray shelly sand with flocculent debris, many animals, with large tubes of *Chaetopterus*, *Telepsavus* and *Phyllochaetopterus*. Coelenterates included

ten sea pens, more than a hundred sand covered anemones and about as many smooth anemones. Among the polychaetes the best represented were *Owenia*, *Lumbrineris*, spionids and *Telepsavus*. The most conspicuous animals were *Ophiothrix spiculata* and *Chaetopterus variopedatus*. Total numbers of species exceeded 79. Crustaceans were represented by many amphipods and tanaids; also some isopods, ostracods, cumaceans, a few small shrimps and crabs, and a pinnotherid crab. Included also were a pycnogonid (4) and an enteropneust (3). This fauna is similar to, but more diversified than, that of the mainland shelf, in comparable depths. A photograph (Plate 8) of the bottom in Emerald Bay in 17 fms (near no. 207) dominated by *Chaetopterus*, depicts a similar area.

2. Sta. 3045 (no. 250), in 42-43 fms. Biological dredge took mud, echinoids, ophiuroids, a holothuroid, a small squid, numerous polychaetes, and many kinds of small crustaceans, especially amphipods and isopods. The dredge was best suited to recover echinoderms, and least effective for infaunal animals.

3. Sta. 2436 (no. 250), in 44 fms. OPG took 1.07 cuft of oily sandy mud and clay. The largest animal was a large red-ribbon nemertean; other animals included a small ceriantharian, amphipods, and many polychaetes. The species are those characteristic of the shelf fauna.

4. Sta. 3603 (near no. 238), in 47 fms. OPG took 0.37 cuft of green shelly sand. Conspicuous were brissopsids, ophiuroids and many other animals. Animals other than those shown on the chart include coelenterates with a small sea pen, smooth and sand-covered burrowing anemones; a small *Glottidia albida*, two small sipunculids; crustaceans with 84 amphipods, 36 cumaceans, 5 anthurid isopods, 2 gnathid isopods, about 90 ostracods, 10 tanaids, and 6 pagurids in small gastropod shells. The largest specimen was *Brissopsis pacifica*, and the most abundant *Nothria stigmatis* with 215 specimens, followed by *Amphiodia urtica* with 126. Total number of species is more than 80, and specimens more than 850.

5. Sta. 2639 (no. 239), in 82 fms. OPG took 1.14 cuft of gray-green sandy mud, with white shelly sand and fine gravel. Most conspicuous were *Ophiothrix spiculata*, with about 25, and *Chloeia pinnata* with 13 specimens. Brown ostracods were numerous, and amphipods less abundant. The fauna is limited in kinds of animals and characteristic of that at the outer edge of the shelf.

6. Sta. 2347 (no. 251), in 100 fms. OPG took 0.25 cuft of gray-green sandy mud with broken shells, echinoid spines and many animals. The largest was *Brisaster townsendi*, the most conspicuous *Chloeia pinnata*, with 40 specimens, and crustaceans were represented by many amphipods and ostracods.

7. Sta. 3605 (near no. 238). OPG took 0.25 cuft of green mud and sand, in 100 fms. All animals were small and inconspicuous. The most abundant were brown ostracods, with more than 100, and *Amphipholis squamata*, with 15 specimens.

8. Sta. 2367 (no. 240), in 230 fms. OPG took 0.5 cuft of gray-green sandy mud and gravel, with dead *Cadulus* shells. The largest species was *Travisia pupa*, the most abundant and conspicuous *Chlocia pinnata*, with 51 specimens. Crustaceans were represented by amphipods (7), tanaids (2), and many ostracods.

Sta. 2344 (no. 252), in 210 fms. OPG took 0.37 cuft sandy mud, gravel, rocks, with animals. The sediments contained many *Rhabdamina* and disklike foraminiferans. The most conspicuous individual was a brissopsid. Other animals are those characteristic of the slope.

Willow Cove

1. Sta. 2121 (no. 238), in 32 fms. OPG dropped twice, recovered 1.26 cuft of sand, mud, dead *Laqueus* shells, a large white sponge, large asteroid, solitary corals, a surface echinoid, mollusks (not identified), numerous crustaceans (not identified), with small shrimps, crabs, many amphipods and some isopods. The polychaetes were represented by more than 39 species and many specimens. The species are those characteristic of the shelf fauna.

2. Sta. 2853 (no. 238), in 35-38 fms. Sigsbee trawl, in rocky bottom, took rocks, sand, silt, siliceous sponge, dead brachiopod (*Laqueus* and *Terebratalia*) shells. Coelenterates included two or more sea pens, two small colonies of hydrocorals, a few solitary corals, several nemerteans, a sipunculid, several polyclads, small crustaceans, especially tanaids (38), amphipods (7), a few isopods, stalked barnacle, *Scalpellum* attached to tubes of *Phyllochaetopterus*, and many different kinds of polychaetes. The most abundant, *Anaitides madeirensis*, had 30 specimens.

3. Sta. 2637 (no. 238), in 40 fms. Campbell grab took 1.14 cuft of gray sandy mud with white shelly debris. The largest species was *Molpadia intermedia*, and the most abundant *Amphiodia digitata* (93). Also present were a ceriantharian (1), *Glottidia albida* (1), crustaceans represented by many amphipods and an epicbalian (2).

4. Sta. 2638 (no. 238), in 40 fms. OPG took 0.93 cuft of gray sand and mud. The largest species were *Lytechinus anamesus* (urchin) and a red nemertean. Most abundant were *Amphiodia urtica* (109) and cirratulid polychaetes.

5. Sta. 2426 (no. 226), in 270 fms. OPG took 1.0 cuft of dark green mud, with siliceous sponge, tesselated small sponge, foraminiferans, and many animals. Largest species was *Thelepus setosus* with commensal, *Lepidasthenia virens*; none was outstandingly abundant. The sample contained also a small, smooth anemone, crustaceans with eight amphipods, a caprellid, five isopods, a tanaid, three cumaceans, an ostracod, and a galatheid crab. Total number of species exceeded 45, and specimens more than 100. Species are those usually found on slopes, characterized by siliceous sponge, the ophiuroid, *Sclerasterias heteropaes*, the galatheid crab, and polychaetes, *Thelepus setosus*, *Onuphis vexillaria*, *Potamethus mucronatus*, and others.

White Cove-Long Point

Two samples from White Cove, taken from shore and by shallow diving, numbered 1370 and 1378 in the Velero series (Fraser, 1943, pp. 358, 359) were useful in disclosing the presence of an unknown scalibregmid, found only in the holdfasts of *Eisenia arborea*; the occurrence of this species was verified by recent samples from the same locality, taken by Mr. Robert Given. The species is described as *Sclerocheilus acirratus* (see above).

1. Sta. 2152 (no. 224). 0.8 mi S of Long Pt., in 19 fms. OPG took 0.85 cuft of sandy mud with many small animals. Only the polychaetes have been analyzed (see chart); these number more than 37 species and 362+ specimens. The most abundant were *Paraonis gracilis* with 50, *Prionospio malmgreni* with 42, *Lumbrineris* spp. with 43, *Aricidea* spp. with 32, and *Odontosyllis phosphorea* with 31 specimens.

2. Sta. 2450 (near no. 224). Near White Cove, in 30-35 fms. Sigsbee trawl took a large sample from a rocky bottom with sand. Largest individual was a sponge, *Geodia mesotriaena* Lendenfeld, measuring 90 mm across; also present were coelenterates, *Corynactis*, *Stylatula* and solitary corals; bryozoans of several kinds; a polyclad, and dead *Laqueus* shells. Crustaceans included amphipods, isopods, ostracods, a few epinebalians, *Scalpellum*, *Eupagurus* in dead *Bursa* shells, and two large spider crabs; also an ascidian with tough tunic. The fauna is that characteristic of a rocky, shelly bottom. *Dendropoma lituella* (vermetid) was represented by numerous colonies, and *Saxicava arctica* burrowed in sponge and rocks. *Octopus apollyon* was represented by a large male and female; *Bursa californica*, dead shell, contained a large hermit crab with commensal polynoid, *Halosydna latior*. The fauna is large, diversified, associated with a rocky, shelly bottom.

3. Sta. 2128 (no. 224). 0.3 mi off Long Pt., in 42-67 fms. Biological dredge took sand, dead *Laqueus* with *Vermiliopsis*, alcyonarian and solitary corals; echinoderms of diversified kinds, including asteroids, ophiuroids, echinoids, holothurians, a crinoid. Mollusks included an octopus, key hole limpets, and various pelecypods and gastropods. Bryozoans were encrusting and stalked. Crustaceans were diversified, with amphipods, isopods, tanaids, cumaceans, ostracods, stalked barnacle, commensal crabs, spider crabs, and cancroids. Polychaetes were diversified, with at least 80 species. No one species was conspicuously abundant.

4. Sta. 2855 (no. 238). Off White Cove, in 36 fms. OPG took an unmeasured amount of black sandy mud with reddish brown waxy lumps. No species was outstandingly large; most abundant was *Chloeia pinnata* with 70 specimens; *Glottidia albida* was present with 14 small individuals. Coelenterates were represented by ceriantharians (4 small), and a small anemone. Several small nemerteans and nematodes; crustaceans with amphipods (12), isopods (2), and ostracods were also present.

5. Sta. 2144 (no. 224). Off Long Pt., in 45 fms. OPG took 1.6 cuft of fine black sand in two grabs. Coelenterates were represented by small specimens of ceriantharian (6), anemones (2), nemerteans (2), and a long, slender sipunculid (1); crustaceans by amphipods (25), brown ostracods (31), cumaceans (3), isopods (3), a tanaid (1), and a small crab (2). The most abundant species were *Aricidea* spp. (112), *Spio punctata* (33), *Chaetozone setosa* (27). The fauna is that characteristic of the outer shelf.

6. Sta. 5727 (no. 225). S of Long Pt., in 57 fms. OPG took 0.37 cuft of glauconitic white shelly sand, with broken *Laqueus* shells, and diversified small animals. Crustaceans included a brown ostracod (more than a hundred), numerous ostracods and amphipods, and sparse numbers of cumaceans and isopods. The most conspicuous animals were *Ophiothrix spiculata* (more than 10) and *Nothria iridescens* (25); the most numerous were *Aricidea* spp. (more than 84).

7. Sta. 2365 (no. 210). Off Long Pt., in 300 fms. OPG took 1.57 cuft of gray-green sand and mud, with dead shells of *Limopsis*, *Cadulus*, small moon snail, turret top shells. Largest specimen was *Brisaster townsendi*, and most conspicuous *Chloeia pinnata* (6). The sample contained an echiuroid fragment, two amphipods, and a polyclad. Characteristic species of this depth are *Maldane sarsi*, *Limifossor diegensis*, and *Brisaster townsendi*.

8. Sta. 2393 (near no. 211), in 250-270 fms. Trawl took kelp holdfasts, rubbly sand and rocky debris. The animals taken are those characteristic of a rocky bottom. Echinoderms (not identified) included echinoids and ophiuroids. Crustaceans were represented by a few amphipods, an isopod and a crab.

Isthmus Cove

1. Isthmus Cove, in diving depths along the rocky north wall, was sampled Nov.-Dec. 1965 (coll. Mr. Robert Given); part of an encrusting colony of the serpulid, *Spirobranchus spinosus*, yielded an association of animals (see chart); the long-spined echinoid, *Centrostephanus coronatus*, occurs in rocky pockets along the wall.

2. Intertidal holdfasts of kelps, *Eisenia arborea*, and larger kelps (coll. Mr. Robert Given) yielded characteristic animals (see chart) with grapsid and pagurid crabs.

3. Sta. 2452 (no. 207) near Isthmus, in 28 fms. OPG took 0.37 cuft of compact sandy clay with many animals and much calcareous debris. In addition to the species named in the chart, a burrowing anemone (2), two nemerteans (2), *Phoronopsis californica*, red in life (1), *Glottidia albida* (1), many amphipods and other small crustaceans, several ascidians and an enteropneust (1) were present. The largest species was *Lanice conchilega*; none was conspicuously abundant. Total number of species was estimated at more than 60, with polychaetes about 30, echinoderms at least 2, mollusks 15, crustaceans many, and others, 8 or more.

A concentration of *Laqueus californicus* is believed to exist along the rocky exposures between Empire Landing and Ship Rock, in 30 to 70 fms, indicated by concentrations of dead shells in these areas. Several probes (4a-4f) were attempted to procure living lamp-shells; the following stations indicated their presence, with associated organisms:

3. Sta. 2955 (near no. 186). SW of Ship Rock, in 34 fms. The dredge took sand, rock, shells of *Laqueus*, *Terebratalia*, *Lytechinus* and other echinoderms, together with *Conus californicus*; the echinoderms included:

Amphiodia urtica
Amphipholis pugetana
Luidia asthenosoma
Luidia foliolata
Ophiopholis bakeri
Ophiopsila californica
Ophiopteris papillosa
Ophiothrix spiculata
Sclerasterias heteropaes

4a. Sta. 2960 (near no. 186). SW of Ship Rock, in 34-36 fms. Dredge took shelly sand with *Laqueus*, *Terebratalia* and other animals, with the following echinoderms:

Amphipholis pugetana
Astropecten californicus
Henricia sp.
Mediaster aequalis
Ophiopholis bakeri
Ophiopteris papillosa
Ophiothrix spiculata
Ophiura lutkeni
Sclerasterias heteropaes

4b. Sta. 2959 (near no. 186). NW off Ship Rock, in 42 fms. Dredge took sand with *Lytechinus*, small pelecypods and other echinoderms, including:

Amphiodia digitata
Amphioplus hexacanthus
Amphiura arcystata
Florometra perplexa
Luidia ludwigi
Lytechinus anamesus
Ophiopholis bakeri
Ophiura lutkeni

4c. Sta. 3310 (near no. 186). NW off Ship Rock, in 47-52 fms. Dredge took sand with a sea pen, few brachiopods and mollusks, several crabs, and the following echinoderms:

Allocentrotus fragilis
Astropecten californicus
Ophiura lutkeni

4d. Sta. 2952 (near no. 208). SE off Ship Rock, in 63 fms. OPG took sand with some living *Laqueus*, *Florometra perplexa* and gastropods.

4e. Sta. 2957 (near no. 186). NW off Ship Rock, in 64 fms. OPG took *Laqueus* with *Allocentrotus fragilis*, *Spatangus californicus* and *Florometra perplexa*.

4f. Sta. 2953 (near no. 208). SE off Ship Rock, in 52-65 fms. Dredge took shelly sand, *Laqueus*, heart-urchins, gastropods, with other animals.

5. Sta. 2451 (no. 208). Between Isthmus and Long Pt., in 111 fms. OPG took 1.57 cuft of compact sandy clay with many animals. In addition to those named in the chart, the sample contained amphipods (20), ostracods (8), an anthurid isopod (3), a tanaid (1), a pagurid in *Amphissa* shell (1). The largest was *Molpadia*, and the most abundant were *Maldane sarsi* (20), and *Tellina carpenteri* (16).

Numbers of species and specimens totalled:

polychaetes	21 species,	60 specimens
echinoderms	4	20
mollusks	8	39
crustaceans	5+	33
Total:	38+species,	152 speciments

6. Sta. 2733 (near no. 187). NE of Ship Rock, in 152 fms. OPG took 1.13 cuft of sandy mud with many animals. In addition to those named in the chart, the sample included a ceriantharian (2), an echiuroid (1), a nemertean (1), amphipods (several), and a gnathid isopod (1). The largest animal was the echiuroid, the most abundant *Amphiodia digitata* (48) and solenogasters (23).

Numbers of species and specimens estimated:

polychaetes	22 species,	40+ specimens
echinoderms	7	77
mollusks	6+	25+
crustaceans	2+	2+
Total:	37+species,	144+ specimens

7. Sta. 2302 (no. 187). Between Isthmus and Ship Rock, in 185 fms. OPG took 1.57 cuft of fine greenish mud with many animals. In addition to those named in the chart, the sample contained a ceriantharian (2), nemerteans (2+), an echiuroid (2), numerous amphipods and a few isopods. The largest individual was a brissopsid echinoid, and the most abundant were ophiuroids. Total numbers were estimated at more than 29 species and 69 specimens.

8. Sta. 2301 (no. 189), in 335 fms. Campbell grab took 3.33 cuft of fine grayish green mud with foraminiferans. In addition to those named in the chart, there were an anemone (2), an echiuroid (1), a sipunculid (3), nemerteans (2+) and an enteropneust (1). The largest animal was an echinoid, and none was outstandingly abundant. Numbers were estimated at 21 species and about 60 specimens.

Howlands Landing

1. Sta. 2142 (no. 186), in 19 fms. OPG took 1.9 cuft of sand and mud with many animals. In addition to those named in the chart, there were several kinds of sponges, some large and spherical, a ceriantharian (1), small sea whips (3), a burrowing anemone covered with coarse sand (4), four kinds of nemerteans (7), sipunculids of more than one

kind (12), a reddish purple echiuroid (1), *Glottidia albida* (1), *Phoronopsis californica* (7), bryozoans of several kinds, an amphipod (1), isopods (2+), two shrimps (5), a crab (1), two enteropneusts (6) and an ascidian (7). The largest animal was a spherical sponge, the most conspicuous *Chaetopterus variopedatus*, and the most abundant *Owenia f. collaris* (60). Total numbers were estimated at more than 60 species, and more than 200 specimens.

2. Sta. 2961 (near no. 186). SW of Ship Rock, in 36 fms. OPG took shelly sand and many animals. In addition to those named in the chart, the sample contained two sponges (2), four coelenterates (20), a nemertean (4), two sipunculids (7), a leech (1), a bryozoan colony (1), a phoronid (6), *Laqueus californicus* (3), *Terebratalia occidentalis* (2), several kinds of amphipods (18), ostracods (31), isopods (5), a cumacean (1), *Mitella polymerus* (22), a decapod (2), and an enteropneust (2).

Numbers of species and specimens totalled:

polychaetes	56 species,	102 specimens
echinoderms	7	69
mollusks	23	105
crustaceans	8+	81
others	17	52
Total:	111+ species, about 409 specimens	

3. Sta. 3569 (near no. 162). N of Howlands Landing, in 100 fms. OPG took 0.69 cuft of green, sandy mud with many animals. The lot contained a large sea-whip, *Cerebratulus rubra*, many polychaetes characteristic of muds in slope depths, small crustaceans, and the following echinoderms:

Amphiacantha amphacantha	22
Amphiodia digitata	27
Amphioplus strongyloplax	12
Amphipholis squamata	3
Amphiura arcystata	1
Brissopsis pacifica	2
Molpadia sp.	1, measuring 75 mm long

4. Sta. 2738 (no. 136). Off Howlands Landing, in 342 fms. Campbell grab took 3.15 cuft of green sticky mud with oily odor and waxy nodules. In addition to those named on the chart, there was a trace of siliceous sponge, a sipunculid (2), a nemertean (3), and an enteropneust (2). Echinoderms were represented by a small ophiuroid.

Numbers of species and specimens totalled:

polychaetes	10 species,	31 specimens
ophiuroid	1	1
mollusks	2	6
others	3	6
Total:	16 species,	44 specimens

West End

1. Sta. 3570 (no. 162), in 48 fms. OPG took 0.56 cuft of sandy mud with shelly debris and considerable life; dead remains included those of *Laqueus*, *Terebratalia*, solitary corals, *Protula* tubes and coralline algae. The most conspicuous living animals are listed in the chart.

2. Sta. 5148 (near no. 162), in 98 fms. OPG took 0.31 cuft of glauconitic sand with foraminiferans and large oil globules. Ophiuroids were most conspicuous. In addition to the species named in the chart, there were six amphipods (19), two cumaceans (3) and three ostracods (37). The largest animals were ophiuroids, and the most abundant *Prionospio malmgreni* (35), *Amphiodia digitata* (29), *Nothria stigmatis* (30), and *Amphiacantha amphacantha* (24). Total numbers were estimated at 45 species and 241 specimens.

3. Sta. 2736 (no. 160), in 132 fms. OPG took 1.57 cuft of sandy green mud with reddish brown waxy lumps and many dead shells of *Cardita*, *Cuspidaria*, *Cadulus*, *Nassarius* and *Thyasira*. In addition to the species named in the chart, there were a few amphipods and isopods. The largest animal was *Brissopsis pacifica*, and the most abundant were *Amphiodia digitata* (64) and *Amphioplus strongyloplax* (22). Total numbers were estimated at 32 species and 140 specimens.

4. Sta. 2389 (no. 161), in 136 fms. OPG took 2.2 cuft of gray sand and mud with many animals. In addition to those listed in the chart, there were a burrowing anemone (1), a polyclad (1), a sipunculid (1), a large echiuroid (1), and a few small crustaceans. Largest species were *Brissopsis pacifica* and the echiuroid, and the most abundant were the ophiuroids. Total numbers were estimated at more than 45 species and 175 specimens.

Sub 4. Sta. 5146 (near no. 160), in 140 fms. Grab took a large basaltic rock, 14″ by 7.5″, with attached large sponge (*Heathia*), solitary coral, alcyonarians (2), tunicates, and bored by pholad mollusks; ophiuroids occupied the crevices, and serpulid polychaetes were attached

on the surfaces. The ophiuroids and mollusks are named in the chart. Most abundant species was *Ophipholis bakeri* (30).

5. Sta. 2737 (no. 135), in 256 fms. OPG took 2.77 cuft of sticky green mud with odor of oil, foraminiferans, and numerous animals. Glassy sponge spicules characterized the mud. In addition to the species named in the chart, the sample contained a large nemertean (2), an echiuroid (2), and an amphipod (1). Largest individuals were the echiuroid and nemertean. Total numbers were estimated at 29 species and 72 specimens.

6. Sta. 2798 (no. 89), in 386 fms. OPG took 2.96 cuft of bluish green-gray mud, with siliceous sponge spicules, radiolarian shells, foraminiferans, otoliths, and deep-water animals. In addition to those named in the chart, there were a nemertean (2), a ghost shrimp (1), and an enteropneust (1). Total numbers were estimated at 20 species and about 35 specimens.

Polychaeta from Santa Catalina Island, showing distributions by profiles, from East End, Avalon, Willow Cove, and White Cove.
+ indicates presence, - absence. Species represented by more than 10 specimens are indicated by *.

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Amaeana occidentalis	+	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-
Ammotrypane aulogaster	+	-	+	-	+	+	+	+	+	-	-	+	+	+	-	+	+	+	-	-	-	+	-	-	+	+	-	-	-	-
Ampharete arctica	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Anaitides sp., checkered	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	+	+	-	-	+	+	-	+	-	-	-	-	-
Aricidea lopezi	+	-	+	+	-	+	+	*	-	-	-	-	+	-	+	-	+	-	+	-	-	+	-	-	-	+	-	-	-	-
Aricidea spp.	+	-	+	*	*	+	-	-	+	*	+	+	*	-	-	+	-	+	-	-	-	-	*	-	+	-	-	-	-	-
Armandia bioculata	*	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
arabellid	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capitella capitata subspp.	*	-	-	*	-	*	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaetozone spp.	*	-	-	-	+	-	-	-	-	-	-	+	*	-	+	-	-	-	-	-	+	+	*	-	-	*	-	-	-	-
Chone spp.	+	-	+	*	*	+	+	-	+	-	-	-	+	-	-	+	-	+	*	-	+	-	-	+	+	-	-	-	-	-
Dexiospira sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dorvillea articulata	+	-	-	+	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Drilonereis sp.	+	+	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	+	+	-	-	-	-	-	+	-	-	-	-	-
Exogone uniformis	+	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	+	-	-	-	-	-
Glycera spp.	+	-	-	-	-	+	+	-	+	+	-	-	-	-	-	-	-	+	*	+	-	-	+	-	+	-	-	-	-	-
Goniada brunnea	+	-	+	+	-	-	+	+	-	+	+	-	+	-	-	-	-	+	-	+	-	+	+	-	+	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Gyptis a. glabra	*	-	+	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Halosydna sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harmothoe hirsuta	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidasthenia longicirrata	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidonotus caelorus	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	+	-	-	-	-	-
Lumbrineris spp.	+	-	-	+	-	+	+	-	-	*	-	-	-	-	-	+	-	-	+	+	+	+	*	-	+	-	-	-	-	-
Nephtys spp.	+	-	-	+	-	+	-	-	-	*	+	-	+	-	-	-	-	+	+	-	-	-	-	-	+	-	-	-	-	-
Owenia f. collaris	*	-	-	+	-	-	-	-	-	*	-	-	*	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-
Pareurythoe californica	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peisidice aspera	+	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	+	-	-	-	-	-
Pherusa capulata	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	*	-	-	-	-	-	-	+	-	-	-	-	-
Pherusa commensalis	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pholoe glabra	+	+	-	+	+	-	+	+	-	+	-	*	*	+	+	+	-	+	-	+	+	-	-	-	-	+	-	-	-	-
phyllodocids	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	+	-	-	-	-
pilargid	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Platynereis bicanaliculata	*	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-
polynoids	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prionospio malmgreni	+	-	+	*	+	-	-	-	-	*	-	-	-	-	-	-	-	+	+	-	-	-	*	-	-	*	-	-	-	-
Prionospio pygmaeus	+	-	-	-	-	-	-	+	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Scalibregma inflatum	+	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-
Scoloplos sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sthenelais spp.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-
Streblosoma sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Syllis sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
syllids, other	+	-	-	-	-	+	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-
spirorbids	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-
Telepsavus costarum	+	-	-	+	-	+	-	-	-	*	-	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Tharyx monilaris	+	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-
Tharyx tesselata	+	+	+	*	+	+	-	-	+	-	-	-	*	-	+	-	-	-	+	+	-	-	-	-	+	*	-	-	-	-
Artacamella hancocki	.	+	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	+	-	-	-	-
Chaetopterus variopedatus	.	+	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glycera americana	.	+	-	-	-	-	-	-	-	+	+	-	+	+	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-
Lepidasthenia ?virens	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	+	-	-	-	-	-
Lumbrineris californiensis	.	+	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magelona pacifica	.	+	+	-	-	*	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Melinna denticulata	.	+	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtys ferruginea	.	*	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poecilochaetus johnsoni	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Spio punctata	.	*	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sternaspis fossor	.	*	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	+	-	+	-	-	+	-	+	+	-	-	-	-
Sthenelanella uniformis	.	*	*	+	-	-	-	-	-	*	-	+	+	-	-	-	-	-	+	+	+	-	+	-	+	-	-	-	-	-
Terebellides stroemii	.	+	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Travisia sp.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aricidea uschakowi	.	.	+	+	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-
Chaetozone multioculata	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaetozone setosa	.	.	*	*	-	+	-	+	+	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Chloeia pinnata	.	.	*	*	-	*	+	*	*	-	-	-	*	*	*	+	*	-	-	-	-	-	-	+	+	*	-	-	-	-
Haploscoloplos elongatus	.	.	+	-	+	-	-	+	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Harmothoe spp.	.	.	+	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Heterospio catalinensis	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isocirrus sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-
Myriochele gracilis	.	.	+	-	+	+	-	-	-	-	*	+	*	+	+	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-
Nothria spp.	.	.	+	-	+	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Onuphis parva	.	.	*	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Paraonis gracilis	.	.	+	-	+	-	-	-	-	+	-	+	+	-	+	-	+	-	-	-	+	-	*	-	-	-	-	-	-	-
Pista cf. cristata	.	.	+	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sthenelais tertiaglabra	.	.	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Thalenessa spinosa			+	+	+	-	-	-	-	-	+	+	+	-	+	-	-	-	-	+	+	-	-	-	+	+	-	-	-	-	-
Thelepus setosus			+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
ampharetids			+	+	+	-	-	-	-	+	-	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphicteis scaphobranchiata			+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Euchone sp.			+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	+	-	-	-	-
Eulalia sp.			+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Exogone sp.			*	+	-	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Harmothoe lunulata			+	-	-	-	-	-	-	+	-	+	-	-	-	-	-	+	+	-	+	-	-	+	-	+	-	-	-	-	-
Harmothoe scriptoria			+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanice conchilega			+	-	+	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-
Magelona spp.			+	+	+	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
maldanids			*	+	-	-	-	-	+	-	-	-	-	+	-	-	+	-	+	-	-	-	-	-	+	-	-	-	-	-	-
Marphysa sanguinea			+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nerinides maculata			+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nothria elegans			*	*	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pectinaria californiensis			+	+	-	-	-	-	-	+	+	+	*	+	-	-	-	+	-	-	-	-	-	+	-	-	+	-	-	-	-
Pherusa neopapillata			+	-	-	-	-	-	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycirrus sp.			+	-	+	-	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-
Praxillella a. pacifica			+	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Scoloplos armiger	.	.	.	*	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiophanes fimbriata	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Amphisamytha bioculata	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Lumbrineris bicirrata	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-
Lumbrineris latreilli	.	.	.	.	+	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Notomastus sp.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scoloplos (Leodamas) sp.	.	.	.	.	+	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiophanes spp.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Anaitides madeirensis	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	+	*	-	-	-	-	-	-	-	-	-	-	-
Chaetozone armata	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirrophorus furcatus	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Laonice cirrata	.	.	.	.	.	+	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-	-	+	-	+	+	-	-	-	-
Lumbrineris nr. acuta	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maldane sarsi	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nothria conchylega	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Nothria iridescens	.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Nothria stigmatis	.	.	.	.	.	+	*	-	+	-	-	-	*	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Notomastus latericeus	.	.	.	.	.	+	-	-	+	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Praxillura maculata	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Prionospio spp.	.	.	.	.	.	+	-	-	+	-	-	+	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-
Protodorvillea gracilis	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aricidea neosuecica	.	.	.	.	.	.	+	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Prionospio cirrifera	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
arabellid, parasitic	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asclerocheilus sp.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harmothoe ?fragilis	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naineris uncinata	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-
Nerinides ?acuta	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtys cornuta	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-
Paraonis, abranchiate	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phylo felix	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sphaerodorum papillifer	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tharyx spp.	.	.	.	.	.	.	.	*	*	-	-	+	-	+	-	+	-	-	-	+	-	-	*	-	-	-	-	-	-	-
Dodecaceria sp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Glycera tesselata	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Langerhansia heterochaeta	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Pherusa sp.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
terebellids	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End 1 2 3 4 5 6 7 8 9	Avalon 1 2 3 4 5 6 7 8	Willow Cove 1 2 3 4 5	White Cove 1 2 3 4 5 6 7 8
Aglaophamus sp.	. . . . .	+ - - - - - - -	- - - - +	- - - - + - - -
capitellids	. . . . .	* - - - - - - -	- + - - -	- - - - - - - -
Caulleriella sp.	. . . . .	* - - - - - - -	- - * - -	- - - - - - - -
Eulalia myriacyclum	. . . . .	+ - - - - - - -	- - - - -	- - - - - - - -
Eumida sp.	. . . . .	+ - - - - - - -	- - - - -	- - - - - - - -
Exogonella brunnea	. . . . .	+ - - - - - - -	- + - - -	- - - - - - - -
Megalomma sp.	. . . . .	+ - + - - - - -	- - - - -	+ - + - - - - -
nereids	. . . . .	+ - - - - - - -	- * - - +	- - + - - - - -
Phyllochaetopterus limicolus	. . . . .	+ - - + - - - -	- - - - +	- - - - - - - -
Polydora spp.	. . . . .	+ - - - - - - -	- - - - +	- + - - - - - -
Praxillella sp.	. . . . .	+ - - - - - - -	- - - - +	- - - - - - - -
Rhodine bitorquata	. . . . .	+ - - - - - - -	- - - - -	- - - - - - - -
Rhynchospio sp.	. . . . .	+ - - - - - - -	- - - - -	+ - - - - - - -
Spiophanes missionensis	. . . . .	* - - + - - - -	- - - - -	* - + - - - - -
spionids	. . . . .	+ - - - - - - -	- - - - -	- - - - - - - -
Panthalis pacifica	. . . . .	. + - - - + - -	- - - + -	- - - - - - - -
Brada pilosa	. . . . .	. . + - - - - -	- - - - +	- - - - - - - -
Lumbrineris cruzensis	. . . . .	. . + - - - - -	- - - - -	- - - - - - - -

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Eteone sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nerinides pigmentata	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Onuphis nebulosa	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Prionospio pinnata	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	+	-	-	+	-	-	-	-	-	+	+	-	-	-	-
scalibregmid	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Cossura candida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	+	-	-	-	-	-	-	-
Laonice ?foliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Travisia pupa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Axiothella sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
cirratulids	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-
disomid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris nr. impatiens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-
Mediomastus californiensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Nereis procera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-
Nicomache sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Phyllochaetopterus prolifica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	*	-	-	-	-	+	+	-	-	-	-	-
Protis pacifica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-
Pseudopotamilla sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	+	-	-	-	-	-
sigalionid	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End 1 2 3 4 5 6 7 8 9	Avalon 1 2 3 4 5 6 7 8	Willow Cove 1 2 3 4 5	White Cove 1 2 3 4 5 6 7 8
Vermiliopsis biformis	. . . . .	. . . . .	* + - - -	- + + - - - - -
Vermiliopsis cornuta	. . . . .	. . . . .	+ + - - -	- + - - - - - -
Arctonoe sp.	. . . . .	. . . . .	. + - - -	- + - - - - - -
Eupolymnia heterobranchia	. . . . .	. . . . .	. + - - -	- - - - - - - -
Notoproctus pacificus	. . . . .	. . . . .	. + - - -	- - + - - - - -
Odontosyllis sp.	. . . . .	. . . . .	. + - - +	- - + - - - - -
Ophiodromus pugettensis	. . . . .	. . . . .	. + - - -	- - + - - - - -
Pherusa papillata	. . . . .	. . . . .	. + - - -	- - + - - - - -
Pista elongata	. . . . .	. . . . .	. * - - -	- + - - - - - -
?Placostegus sp.	. . . . .	. . . . .	. + - - -	- + + - - - - -
sabellid	. . . . .	. . . . .	. + - - -	- - - - - - - -
Trypanosyllis sp.	. . . . .	. . . . .	. + - - -	- - - - - - - -
Typosyllis sp.	. . . . .	. . . . .	. + - - -	- - - - - - - -
Euclymene sp.	. . . . .	. . . . .	. . + - -	- - - - - - - -
Eunice americana	. . . . .	. . . . .	. . + - -	- - - - - - - -
?Eunoe sp.	. . . . .	. . . . .	. . . . +	- - - - - - - -
Glycera branchiopoda	. . . . .	. . . . .	. . . . +	- - - - - - - -
Lysippe annectens	. . . . .	. . . . .	. . . . +	- - - - - - - -
Notomastus magnus	. . . . .	. . . . .	. . . . +	- - - - - - - -

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Onuphis vexillaria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Potamethus mucronatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
?Pista spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	+	-	-	-	-	-
Ampharete spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-
Aphrodita sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Diopatra sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Fabricia sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Ninoe sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Odonotosyllis phosphorea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	#	+	-	-	-	-	-	-
Sthenelais fusca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Sthenelais verruculosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Anaitides medipapillata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-
Halosydna latior	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Vermiliopsis infundibulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Amage anops	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Amphicteis mucronata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Anobothrus gracilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Aphrodita parva	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Apomatus geniculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Eumida tubiformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Euphrosine sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Eunice spp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Hypephesia papillifer	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Nothria hiatidentata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Oncoscolex pacificus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Polydora armata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Protula superba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Rhamphobrachium longisetosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Sabellaria cementarium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Diopatra tridentata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-
Cirriformia sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-

Echinodermata from Santa Catalina Island, showing distributions by profiles, from East End, Avalon, Willow Cove, and White Cove.

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Ophiothrix spiculata	*	-	-	+	-	-	-	-	-	*	-	-	-	*	-	-	-	-	+	-	-	-	-	-	-	-	-	*	-	-
Amphiacantha amphacantha	.	+	-	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphiodia urtica	.	*	-	-	-	*	-	-	+	+	-	-	*	-	*	+	-	-	-	-	*	+	-	-	-	-	-	-	+	-
Amphipholis squamata	.	+	-	+	+	*	-	-	-	+	-	-	*	-	-	*	+	-	-	-	-	*	-	-	-	-	-	-	-	-
Amphiura arcystata	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
Astropecten californicus	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Leptosynapta albicans	.	*	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	+	-	-
ophiuroids	.	.	+	-	-	-	*	*	-	-	*	-	-	*	-	-	-	-	+	-	-	-	-	+	+	+	+	+	-	+
Cucumaria sp.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Amphiodia digitata	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-
Amphiodia occidentalis	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lovenia cordiformis	.	.	.	.	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spatangus californicus	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brissopsis pacifica	.	.	.	.	.	+	+	+	+	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-
Pachythyone ?rubra	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
holothuroids	.	.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-
Lytechinus anamesus	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	+	-	-
Brisaster townsendi	.	.	.	.	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Echinodermata from Santa Catalina Island (continued)

	East End 1 2 3 4 5 6 7 8 9	Avalon 1 2 3 4 5 6 7 8	Willow Cove 1 2 3 4 5	White Cove 1 2 3 4 5 6 7 8
Ophiopsila californicus	. . . . .	+ - - - - - - -	- - - - -	- - - - - - - -
Pentamera pseudopopulifera	. . . . .	+ - - - - - - -	- - - + -	- - - - - - - -
echinoids	. . . . .	. + - - - - - -	- - - - -	- + + - - - - +
Allocentrotus sp.	. . . . .	. . . . . +	- - - - -	- - - - - - - -
Ophiura leptoctenia	. . . . .	. . . . . +	- - - - -	- - - - - - - -
asteroid	. . . . .	. . . . .	. + - - -	- - + + + - - -
?Caudina sp.	. . . . .	. . . . .	. . + - -	- - - - - - - -
Molpadia intermedia	. . . . .	. . . . .	. . + - -	- - - - - - - -
Sclerasterias heteropaes	. . . . .	. . . . .	. . . . +	- - - - - - - -
Astropecten sp.	. . . . .	. . . . .	. . . . .	. + - - - - - -
Stichopus sp.	. . . . .	. . . . .	. . . . .	. + - - - - - -
crinoid	. . . . .	. . . . .	. . . . .	. . + - - - - -
Ophiocynodus corynetes	. . . . .	. . . . .	. . . . .	. . . + - - + -

Mollusca from Santa Catalina Island, showing distributions by profiles, from East End, Avalon, Willow Cove, and White Cove.

Cadulus sp.	. + - - + - - - -	- - - - - - - -	- - - - -	- - - + - - - -
Nucula sp.	. + - - - - - - -	- - - - - - - -	- - - - -	- - - - - - - -
pteropod	. + - - - - - - -	- - - - - - - -	- - - - -	- - - - - - - -

Mollusca from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
solenogasters	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	+	-
Tellina sp.	.	+	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Thyasira sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amygdalum pallidulum	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Axinopsida serricata	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Parvilucina tenuisculpta	.	.	*	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Aglaja sp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nemocardium sp.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bittium sp.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
caecid	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cardita sp.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epitonium sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eulima sp.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melanella sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neosimnia sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
chiton	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	+	-	-	+
gastropods	.	.	.	.	.	+	-	-	-	*	*	-	-	-	-	-	-	-	-	-	*	-	-	-	+	+	-	-	-	+
Limopsis diegensis	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balcis rutila	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Mollusca from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
Bittium catalinensis	.	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Micranellum crebricinctum	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellina carpenteri	.	.	.	.	.	.	+	+	-	-	-	-	+	+	+	-	+	-	-	+	-	-	-	-	-	-	-	+	-	-
Nassarius sp.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
turret shells	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
slug	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Conus californicus	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pelecypods	.	.	.	.	.	.	.	.	.	*	*	-	-	-	-	-	-	-	+	-	+	+	-	-	+	+	-	-	+	+
Compsomyax subdiaphana	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lima subauriculata	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lyonsia californica	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Acila castrensis	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Adontorhina cyclia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyrilla munita	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aligena sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadulus tolmiei	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-	+	-
Thyasira trisinuata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamys sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Dendropoma lituella	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	-	-	-	-	*	-	-	-	-	-	-

Mollusca from Santa Catalina Island (continued)

	East End									Avalon								Willow Cove					White Cove							
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	1	2	3	4	5	1	2	3	4	5	6	7	8
nudibranchs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Saxicava arctica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-
Cadulus fusiformis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Nemocardium centrifilosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Solamen columbianum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Bursa californica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Chlamys hericius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Octopus apollyon	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	-	-	-	-	-
Philine sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Pleurobranchaea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Pterynotus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
keyhole limpet	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Eulima californica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-
Nucula carlottensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-
Solariella peramabilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-
?Lithophaga sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+

Polychaeta from Santa Catalina Island,
showing distributions by profiles,
from Isthmus Cove, Howlands Landing, and West End.
+ indicates presence, - absence.
Species represented by more than 10 specimens are indicated by *.

	Isthmus Cove								Howl. Land.				West End					
	1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	4	5	6
Dodecaceria concharum	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pherusa inflata	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycirrus californicus	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polydora sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spirobranchus spinosus	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Typosyllis sp.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Vermiliopsis infundibulum	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eunice spp.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Exogone uniformis	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fabricia pacifica	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harmothoe hirsuta	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidonotus caelorus	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris latreilli	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nereis mediator	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phragmatopoma californica	.	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
phyllodocid, unknown	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycirrus sp.	.	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-
Polydora ligni	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polyophthalmus pictus	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmacina dysteri	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sclerocheilus acirrata	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sphaerosyllis sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
spionids	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
spirorbids	.	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Typosyllis aciculata	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aglaophamus dicirris	.	.	+	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-
Amaeana occidentalis	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ampharetids	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*

Polychaeta from Santa Catalina Island (continued)

	Isthmus Cove								Howl. Land.				West End					
	1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	4	5	6
Aricidea spp.	.	.	+	-	-	+	-	+	-	+	-	+	-	-	+	+	-	-
capitellid	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Chaetopterus variopedatus	.	.	+	-	-	-	-	-	*	+	-	-	-	-	-	-	-	-
cirratulid	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diopatra ornata	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eumida, trilineate	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glycera spp.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	+	+	-	-
Lanice conchilega	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Lepidasthenia spp.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Lumbrineris spp.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	+	+	-	-
maldanids	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Megalomma sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panthalis pacifica	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pista cf. cristata	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Pista elongata	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prionospio pinnata	.	.	+	+	-	-	+	-	-	+	-	-	-	-	+	+	-	-
Rhodine bitorquata	.	.	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Spiophanes sp.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Sternaspis fossor	.	.	+	+	-	-	-	-	+	+	-	-	-	-	+	+	-	-
Sthenelanella uniformis	.	.	+	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-
Streblosoma crassibranchia	.	.	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-
syllids	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Telepsavus costarum	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terebellides stroemii	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-
Thalenessa spinosa	.	.	+	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-
Thelepus setosus	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aedicira ramosa	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphicteis scaphobranchiata	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-
Anaitides medipapillata	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Brada pilosa	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloeia pinnata	.	.	.	.	+	+	-	-	-	+	-	-	-	-	-	-	-	+

Polychaeta from Santa Catalina Island (continued)

	Isthmus Cove								Howl. Land.				West End					
	1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	4	5	6
Cossura candida	.	.	.	.	+	+	+	+	-	-	-	-	-	-	-	+	-	-
Drilonereis nuda	.	.	.	.	+	-	-	-	-	-	-	-	-	+	+	-	-	-
Glycera capitata	.	.	.	.	+	+	-	-	-	-	-	-	-	+	-	-	-	-
Goniada brunnea	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	+	-	-
Haploscoloplos panamensis	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-
Harmothoe spp.	.	.	.	.	+	+	-	-	+	+	-	-	-	-	-	-	+	-
Laonice cirrata	.	.	.	.	+	-	-	-	-	+	-	-	-	-	+	-	-	-
Lumbrineris cruzensis	.	.	.	.	+	-	+	-	-	+	-	-	-	-	-	-	-	+
Maldane sarsi	.	.	.	.	*	+	*	-	-	+	-	+	-	-	+	+	+	-
Nereis sp.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-
Notomastus sp.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-	-	-	-
Pholoe glabra	.	.	.	.	+	-	-	-	+	-	-	-	-	+	+	*	-	-
Praxillella a. pacifica	.	.	.	.	+	-	+	+	-	-	-	-	-	-	-	-	-	-
Sphaerodoridium minutum	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Tharyx monilaris	.	.	.	.	*	-	+	-	-	-	-	-	-	-	-	-	-	-
Anaitides spp.	.	.	.	.	.	+	-	-	+	+	-	-	-	+	-	+	-	-
Brada glabra	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	+	-
Haploscoloplos elongatus	.	.	.	.	.	*	*	-	-	+	-	-	-	-	+	+	-	-
Nothria sp.	.	.	.	.	.	+	-	-	-	+	-	-	-	-	-	+	-	-
Nephtys cornuta	.	.	.	.	.	+	+	-	-	+	-	-	-	-	+	+	+	-
Nephtys spp.	.	.	.	.	.	+	+	-	-	-	-	-	-	-	-	-	-	-
Onuphis parva	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	+	-
Pectinaria californiensis	.	.	.	.	.	+	+	-	-	+	-	-	-	+	+	+	-	-
Phyllochaetopterus sp.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
pilargid	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	+	-	-
polynoid	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Tharyx tesselata	.	.	.	.	.	+	-	-	-	+	-	-	-	+	-	-	+	-
Travisia sp.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-
Aglaophamus sp.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Ammotrypane aulogaster	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-
Ancistrosyllis breviceps	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-

Polychaeta from Santa Catalina Island (continued)

	Isthmus Cove 1	2	3	4	5	6	7	8	Howl. Land. 1	2	3	4	West End 1	2	3	4	5	6
Aricidea lopezi							+	-	-	-	-	-	-	-	-	-	-	-
Amphicteis sp.							+	-	-	-	-	-	-	-	-	-	-	-
Brada pluribranchiata							+	-	-	-	-	-	-	-	-	-	-	-
Chone sp.							+	-	-	+	-	-	-	+	-	+	-	+
Harmothoe scriptoria							+	-	-	-	-	-	-	-	-	-	-	-
Laonice foliata							+	-	-	-	-	-	-	-	-	-	-	-
Melinna denticulata							+	-	-	-	-	-	-	+	+	*	-	-
Nothria iridescens							+	-	-	-	-	-	-	-	-	-	-	-
Paraonis g. oculata							+	+	-	-	-	-	-	-	-	-	-	-
Phyllochaetopterus limicolus							+	-	-	+	-	+	-	-	-	-	-	+
Prionospio cirrifera							+	+	-	-	-	-	-	-	-	-	-	-
Spiophanes fimbriata							+	-	-	+	-	-	-	-	-	-	-	-
Travisia pupa							+	-	-	-	-	-	-	-	-	-	-	-
Anobothrus gracilis								+	-	-	-	-	-	-	-	-	+	-
Califia calida								+	-	-	-	-	-	-	-	-	-	+
?Leiochrides sp.								+	-	-	-	+	-	-	+	-	-	-
Lysippe annectens								+	-	-	-	+	-	-	-	-	-	-
Myriochele gracilis								+	-	+	-	+	-	+	+	+	+	-
Potamethus mucronatus								+	-	-	-	+	-	-	-	-	-	-
Protula superba								+	-	+	-	+	-	-	-	-	-	+
Chaetozone setosa									+	+	-	-	-	-	-	-	-	-
Cirriformia sp.									+	-	-	-	-	-	-	-	-	-
Eulalia myriacyclum									+	-	-	-	-	-	-	-	-	-
Eumida sp.									+	-	-	-	-	-	-	-	-	-
Notomastus latericeus									+	-	-	-	-	-	-	-	-	-
Owenia f. collaris									*	+	-	-	-	-	-	-	-	-
Paraonis gracilis									+	-	-	-	-	-	-	+	-	-
Pherusa capulata									+	-	-	-	-	-	-	-	-	-
Pherusa neopapillata									+	+	-	-	-	+	-	-	+	-
Phyllochaetopterus prolifica									+	-	-	-	-	-	-	-	-	-
Prionospio malmgreni									+	+	-	-	-	+	+	+	-	-

Polychaeta from Santa Catalina Island (continued)

	Isthmus Cove								Howl. Land.				West End					
	1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	4	5	6
Psammolyce sp.									+	-	-	-	-	-	-	-	-	-
Pseudopotamilla sp.									+	-	-	-	-	-	-	-	-	-
Scalibregma inflatum									+	+	-	-	-	-	-	-	-	-
Sthenelais tertiaglabra									+	-	-	-	-	+	-	-	-	-
terebellids									+	-	-	-	-	-	-	+	-	-
Tharyx spp.									+	-	-	-	-	-	-	+	-	-
Trypanosyllis sp.									+	-	-	-	-	-	-	-	-	-
Vermiliopsis sp.									+	-	-	-	-	-	-	-	-	-
Dorvillea articulata									.	+	-	-	-	-	-	-	-	-
Eulalia spp.									.	+	-	-	-	-	-	-	-	-
Gyptis a. glabra									.	+	-	-	-	-	-	-	-	-
Nereis ?procera									.	+	-	-	-	-	-	-	-	-
Peisidice aspera									.	+	-	-	-	-	-	-	-	-
Pista disjuncta									.	+	-	-	-	-	+	-	+	-
Placostegus sp.									.	+	-	-	-	-	-	-	-	-
Rhamphobrachium longisetosum									.	+	-	-	-	-	-	-	-	-
sabellid									.	+	-	-	-	-	-	-	-	-
sigalionids									.	+	-	-	-	-	-	-	-	-
Thelepus sp.									.	+	-	-	-	-	-	-	-	-
Timarete sp.									.	+	-	-	-	-	-	-	-	-
Vermiliopsis biformis									.	+	-	-	-	-	-	-	-	-
Amage ?anops									.	.	.	.	.	*	-	-	-	-
Aricidea neosuecica									.	.	.	.	.	+	-	-	-	-
Chaetozone corona									.	.	.	.	.	+	-	-	-	-
Naineris uncinata									.	.	.	.	.	+	-	-	-	-
Nothria stigmatis									.	.	.	.	.	*	-	-	-	-
?Mesochaetopterus sp.									.	.	.	.	.	+	+	-	-	-
Drilonereis sp.									.	.	.	.	.	.	.	+	+	-
Eunice aphroditois									.	.	.	.	.	.	.	+	-	-
Ancistrosyllis tentaculata									.	.	.	.	.	.	.	.	+	-
Cirratulis, unknown sp.									.	.	.	.	.	.	.	.	+	-

Polychaeta from Santa Catalina Island (continued)

	Isthmus Cove 1	2	3	4	5	6	7	8	Howl. Land. 1	2	3	4	West End 1	2	3	4	5	6
Cirrophorus aciculatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-
Leiochrides hemipodus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-
Pherusa, unknown sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-
Aricidea uschakowi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
capitellid, unknown	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Glycera branchiopoda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
?Isolda sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+

Echinodermata from Santa Catalina Island
showing distributions by profiles,
from Isthmus Cove, Howlands Landing, and West End.

Centrostephanus coronatus	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lytechinus anamesus	.	+	-	-	-	-	-	-	-	+	+	-	+	-	-	-	-	-
Ophiothrix spiculata	.	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-
holothuroids	.	.	+	-	-	+	-	-	+	-	-	-	-	-	+	+	-	-
Allocentrotus fragilis	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Amphiodia digitata	.	.	.	+	-	*	-	-	-	-	*	-	*	*	*	-	-	-
Amphiodia urtica	.	.	.	+	+	+	-	-	-	*	-	-	-	-	-	-	-	-
Amphioplus hexacanthus	.	.	.	+	-	-	-	-	-	+	+	-	+	-	-	-	-	-
Amphipholis pugetana	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Amphiura arcystata	.	.	.	+	+	-	-	-	-	-	+	-	+	-	-	-	-	-
Astropecten californicus	.	.	.	+	-	-	-	-	-	+	+	-	+	-	-	-	-	-
Florometra perplexa	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Henricia sp.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luidia asthenosoma	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luidia foliolata	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luidia ludwigi	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mediaster aequalis	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiopholis bakeri	.	.	.	+	-	-	-	-	-	+	+	-	-	-	-	*	-	-
Ophiopsila californica	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiopteris papillosa	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophiura lutkeni	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Echinodermata from Santa Catalina Island (continued)

	Isthmus Cove 1	2	3	4	5	6	7	8	Howl. Land. 1	2	3	4	West End 1	2	3	4	5	6
Sclerasterias heteropaes	.	.	.	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-
Spatangus californicus .	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphipholis squamata . .	.	.	.	.	+	+	-	-	-	-	+	-	-	-	+	-	-	-
Molpadia intermedia . . .	.	.	.	.	+	-	-	-	-	-	+	-	-	-	-	-	-	-
Amphioplus strongyloplax	.	.	.	.	.	*	-	-	-	-	*	-	+	-	*	-	-	-
Brisaster townsendi . . .	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Brissopsis pacifica . . .	.	.	.	.	.	+	+	-	-	-	+	-	-	-	+	+	-	-
ophiuroids	.	.	.	.	.	+	-	-	*	-	-	+	-	-	+	*	+	+
Amphiacantha amphacantha	.	.	.	.	.	.	.	.	.	*	*	-	*	+	+	-	-	-
Leptosynapta albicans . .	.	.	.	.	.	.	.	.	.	+	-	-	-	+	-	-	-	-
Parastichopus californicus	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Pentamera pseudopopulifera	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Molpadia sp.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Ophionereis eurybrachiplax	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Ophiacanthia diplasia . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-

Mollusca from Santa Catalina Island,
showing distributions by profiles,
from Isthmus Cove, Howlands Landing, and West End.

Acteon punctocoelata . .	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amygdalum pallidulum . .	.	.	+	-	+	-	-	-	-	+	-	-	-	+	-	-	-	-
Axinopsida serricata . .	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-
Cylichna diegensis . . .	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elaeocyma halocydne . . .	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eulima californica . . .	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lyonsia californica . . .	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nemocardium centrofilosum	.	.	+	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-
Nucula linki	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuculana taphria	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Parvilucina tenuisculpta	.	.	+	-	-	-	-	-	-	*	-	-	-	-	-	-	-	+
Saxicava arctica	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Sinum scopulosum	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-

Mollusca from Santa Catalina Island (continued)

	Isthmus Cove								Howl. Land.				West End					
	1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	4	5	6
Solamen columbianum	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Tellina carpenteri	.	.	+	-	*	+	-	-	-	+	-	-	-	-	-	-	-	-
Cardiomya pectinata	.	.	.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-
Cardita ventricosa	.	.	.	.	*	+	-	-	-	-	-	-	-	-	-	-	+	-
Cuspidaria apodema	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
solenogasters	.	.	.	.	+	*	+	-	-	-	-	+	-	-	-	-	+	-
Thyasira barbarensis	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadulus tolmiei	.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	+	+
Cuspidaria sp.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
Lima dehiscens	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-
gastropods	.	.	.	.	.	.	*	-	*	-	-	-	-	+	-	-	-	-
pelecypods	.	.	.	.	.	.	*	-	*	-	-	+	-	-	-	-	-	-
Acteocina intermedia	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Aglaja sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Balcis catalinensis	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Clinocardium nuttalli	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Conus californicus	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Cyrilla munita	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Kellia suborbicularis	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Lima subauriculata	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Micranellum crebricinctum or M. sp.	.	.	.	.	.	.	.	.	.	*	-	-	-	+	-	-	-	-
Nuculana hamata	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Pandora bilirata	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Pseudochama exogyra	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Sphenia fragilis	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Turbonilla sp.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Verticordia ornata	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Volvulella tenuissima	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-
Dentalium sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	+	-	-
Epitonium tinctum or E. sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-
Tellina modesta	.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-

Mollusca from Santa Catalina Island (continued)

	Isthmus Cove								Howl. Land.				West End					
	1	2	3	4	5	6	7	8	1	2	3	4	1	2	3	4	5	6
Saxicava cf. rugosa																+	-	-
Amphissa bicolor																+	+	-
Dacrydium pacificum																*	*	-
Protochaetoderma californica																+	+	-
Nitidella permodesta																		+

SANTA CATALINA ISLAND, WINDWARD SIDE

The grab was lowered along transect lines extending oceanward, from the outer side of West End, Ribbon Rock (see Map 2), Catalina harbor, Farnsworth bank, China Point to Salta Verde point, and Palisades. Analyses disclosed changes in faunal composition by place and depth. Many species were found which are unknown on the leeward side of the island. The finding of a conspicuous bryozoan fauna on Farnsworth bank, and a large population of the lingulate brachiopod at Palisades were noteworthy.

West End

1. Sta. 3577, in 15 fms. A snapper sampler took black debris with large tubes of *Chaetopterus variopedatus* and many associated animals, resembling those at White Cove, SCI, in comparable depths.

2. Sta. 3576, in 36 fms. OPG took 0.37 cuft of shelly sand with broken shells, chiefly *Mytilus* and other shelf-mollusks, also bryozoan clusters, fragmented tubes of *Telepsavus costarum* and *Phyllochaetopterus prolifica*. In addition to the species named in the chart, there were a small ceriantharian (5), an anemone covered with coarse, black sand (12), a long ribbonlike polyclad (1), a nemertean (3), a slender sipunculid (12), a phoronid in coarse, sand-covered tube (12), amphipods of several kinds (many), an anthurid isopod (several), a tanaid (7), an ostracod (7), a cumacean (2), a dromiid crab (2), and *Glottidia albida* (5). The largest species was *Glycera americana*; none was conspicuously abundant. Total numbers were estimated at more than 80 species and 575 specimens.

3. Sta. 3575, in 44 fms. OPG took 0.25 cuft of green shelly sand with rock chips. The sample contained many small to very small animals, like those on the leeward side of the island. Rocks had attached *Vermiliopsis* and tubes of *Pista*. Polychaetes, echinoderms, mollusks and small crustaceans were diversified and represented by immature individuals.

4. Sta. 3573, in 88 fms. OPG took 0.31 cuft of glauconitic white sand, with echinoid (*?Lytechinus*) spines, foraminiferans and many small animals, like those of the leeward side of the island. None was large; most abundant species were *Nothria stigmatis* (140), *Chloeia pinnata* (52) and *Amphiodia digitata* (45).

Numbers of species and specimens were estimated at:

polychaetes	35 species,	302 specimens
echinoderms	4	51
mollusks	2+	few
crustaceans	5	24
others	1	1
Total:	47+ species,	378+ specimens

5. Sta. 3572, in 103 fms. OPG took 0.25 cuft of glauconitic white sand with shelly rubble, siliceous sponge spicules and many small animals; none was conspicuous or large. Most numerous and abundant were polychaetes, chiefly onuphids, cirratulids and spionids. Most abundant were *Nothria stigmatis* (56), *Amphiodia urtica* (43), *Chloeia pinnata* (23) and *Haploscoloplos elongatus* (10). Polychaetes numbered 26 species; none was unique to the area. Echinoderms were represented by two ophiuroids (49), and mollusks by four or more species, each with few specimens. Small crustaceans were represented by amphipods, isopods, tanaids and cumaceans.

Ribbon Rock

1. Sta. 3580, in 40 fms. OPG took 1.26 cuft of grayish green, sandy mud. Most conspicuous were a large *Luidia foliolata*, purple holothurians, *Ophiothrix spiculata* and other ophiuroids. The sample contained also a small sea pen, an anemone, polychaetes with about 35 species, mollusks with *Cadulus* (28); and small pelecypods and gastropods; small crustaceans were represented by many amphipods, cumaceans (26), an isopod (1), a small cancroid crab (2), and a pinnotherid crab (2).

2. Sta. 3579, in 48 fms. OPG took 1.76 cuft of grayish green, sandy mud with shelly rubble and many animals. Largest was *Cerebratulus rubra*, and most conspicuous were *Amphipholis squamata* (82), *Amphioplus strongyloplax* (7), *Amphiacantha amphacantha* (4), *Leptosynapta albicans* (16) and *Pentamera pseudopopulifera* (3). In addition to the species named in the chart, crustaceans were present as amphipods, isopods, cumaceans and tanaids, each with few individuals; other animals were small anemones (2), and a large *Cerebratulus rubra*.

Numbers of species and specimens totalled:

polychaetes	42 species,	ca. 400 specimens
echinoderms	5	112
mollusks	8	18
crustaceans	5+	10+
others	4	21
Total:	64+ species,	561+ specimens

Catalina harbor

Catalina harbor was sampled in 4 to 100 fms. Shallower depths, in 0.5 to 10 fms, had been previously reported (Reish, 1964) when 43 species of polychaetes were named, identical with those of the mainland shelf, in comparable depths.

1. Sta. 3586, in 4 fms. A snapper took about a liter of gray mud with many small animals and a large nemertean, *Cerebratulus lineolatus*. Most abundant were *Lumbrineris limicola* and *L. minima* (together 260), *Prionospio malmgreni* (177), *Paraonis gracilis* (40), *Haploscoloplos elongatus* (35), and *Tharyx monilaris* (23+). Small crustaceans were present as amphipods, tanaids and cumaceans. Echinoderms were absent.

Numbers of species and specimens totalled:

polychaetes	29 species,	600+ specimens
mollusks	5+	10+
crustaceans	5+	50+
others	4	17
Total:	43+ species,	677+ specimens

2. Sta. 3585, in 23 fms. OPG took 1.89 cuft of gray mud with much shelly and mucoid debris and many small animals. In addition to those named in the chart, there were a sand-covered and a smooth anemone (2), a nemertean in mucoid tube (4), *Golfingia* sp. (7), an echiuroid (1), *Dendrostoma* sp. (2), a phoronid (1) and *Glottidia albida* (14). The most conspicuous were ophiuroids. Most numerous were *Tharyx multifilis* (56), *Amphiodia urtica* (38), *Nephtys ferruginea* (24), *Ophiopholis longispina* (21) and *Amphipholis pugetana* (20). Crustaceans were present as amphipods (many) isopods, cumaceans, tanaids.

Numbers of species and specimens totalled:

polychaetes	52 species,	289 specimens
echinoderms	11	106
mollusks	7	10
crustaceans	10+	many
others	7	39
Total:	87+ species,	444+ specimens

3. Sta. 3584, in 48 fms. OPG took 2.0 cuft of gray mud with shell fragments, mucoid debris, and many animals. In addition to those listed in the chart, there was a loose-pannicled sea pen (1), a nemertean (2), amphipods (7), anthurid and gnathid isopods (2), a cumacean (1) and an enteropneust (2). Largest species were the sea pen and *Pista disjuncta*, and most conspicuous was *Amphiura arcystata*. Most abundant were *Amphiodia urtica* (97) and *Amphiura arcystata* (14).

Numbers of species and specimens totalled:

polychaetes	34 species,	77 specimens
echinoderms	7	110
mollusks	5	5
crustaceans	4+	11
others	3	11
Total:	53+ species,	214 specimens

4. Sta. 3581, in 100 fms. OPG took 1.76 cuft of grayish green, sandy mud with shell fragments, mucoid debris, and many animals. In addition to those named in the chart, there was a nemertean (1), a sipunculid (1), amphipods (12), an anthurid isopod (1), and an ostracod (1). The largest species was *Nephtys glabra* (weight 53 grams), and the most numerous was *Amphioplus strongyloplax* (25).

Numbers of species and specimens totalled:

polychaetes	38 species,	104 specimens
mollusks	6	6
echinoderms	6	33
crustaceans	3+	14
others	2	2
Total:	55+ species,	159 specimens

Farnsworth Bank

1. Sta. 3594, in 16 fms. OPG took a fraction of a rocky shoal, with hydrocorals, bryozoans, red algae and many associated animals. Noteworthy were ophiuroids, snapping shrimps, many amphipods associated with algae, many branches of salmon-pink, fenestrated bryozoans, *Phidolophora pacifica*, purple hydrocoral, *Allopora californica* with commensal gastropod, *Pedicularia californica*, and many other animals. In addition to those named in the chart, there were present also a nemertean (1), a sipunculid (1), a polyclad (1), a caprellid (1), isopods (10+), tanaids (2), an epinebalian (3), small crabs (2+), and a pycnogonid (3). Some of the bryozoans are named elsewhere (see list of bryozoans, identified by Mr. William Banta). The total numbers of species and specimens are not estimated, but are expected to be much higher than that in adjacent soft-bottoms, because of the larger numbers of epifaunal animals.

2. Sta. 3595, in 16 fms. OPG took 0.47 cuft of coralline nodules, with green *Ulva*, many bryozoan clusters, broken shells of large *Hinnites*, *Astarte*, *Astrea*, slipper limpets, many large fragments of dead hydrocorals, and dead shells penetrated by boring sponge. Animals were

very numerous and diversified. In addition to those listed in the chart, there were a ceriantharian (1), a polyclad (3), small nemerteans (2), sipunculids penetrating coral stems (6+), an oligochaete (6), many kinds of bryozoans, differing from those in the preceding sample, amphipods (many), isopods, especially anthurids (many), tanaids, pagurid crabs, shrimps, a pycnogonid (3), and a small enteropneust (1). The most conspicuous species were *Ophiothrix spiculata* (30), *Amphipholis squamata* (38), and a large *Asterina miniata*.

Numbers of species and specimens, excluding bryozoans (see list of species elsewhere), totalled:

polychaetes	62 species,	459 specimens
echinoderms	8	105
mollusks	7+	20+
crustaceans	5+	50+
others (excl. bryozoans)	7	17
Total:	89+ species,	651+ specimens (excluding bryozoans)

Sta. 3597, in 35 fms. OPG took 1.44 cuft of fine gray sandy mud with many small animals. The most conspicuous and abundant species was *Amphiodia urtica* (177), and other species were like those of the mainland shelf in comparable depths and sediments.

Sta. 3593, in 52 fms. OPG took 0.5 cuft of glauconitic sand and much biological rubble. Animals were like those of the shelf, but in sparser numbers. Characteristic echinoderms were *Amphiodia occidentalis* and *Amphipholis squamata*, and polychaetes were *Pherusa capulata* and *Chloeia pinnata*, with many other smaller kinds.

Sta. 3592, in 57 fms. OPG took 0.44 cuft of shelly, glauconitic sand, calcareous algae and gravelly rubble. There were no large, conspicuous animals; all were small, diversified, best represented by polychaetes and crustaceans, like those of the mainland shelf in comparable depths.

Sta. 3591, in 88 fms. OPG took 0.14 cuft of glauconitic sand with many kinds of small animals, most in sparse numbers, and *Rhabdamina* foraminiferans. Characteristic polychaetes were *Nothria stigmatis, Pista* cf. *cristata*, small maldanids, cirratulids, and other diversified kinds. Echinoderms were represented by *Amphipholis squamata*, *Amphiodia urtica* and *Astropecten californica*, and mollusks by *Amygdalum pallidulum*, *Cadulus*, *Tellina*, and others. Crustaceans were present as many amphipods, a few isopods, tanaids, many ostracods, some cumaceans and a small shrimp.

Between China Point and Salta Verde Point

1. Sta. 3600, in 25 fms. OPG took 0.25 cuft of sandy mud with many animals. In addition to those named in the chart, there was a ceriantharian (1), small anemones (2), a hydroid branch (2), a nemertean (2), a branching bryozoan, *Glottidia albida* (13), amphipods (20), a gnathid isopod (1), a cumacean (3), a small crab (1), a pinnotherid crab (1), a pycnogonid (2), and a sand-covered ascidian (2). Most conspicuous and abundant species were *Glottidia albida* (13), tubes of *Streblosoma crassibranchia* (many) and *Sthenelanella uniformis* (10+).

Numbers of species and specimens totalled:

polychaetes	41 species,	146 specimens
echinoderms	6	19
mollusks	10	32
crustaceans	5+	26
others	7	24
Total:	69+ species,	247 specimens

2. Sta. 2176, in 28 fms. OPG took 1.32 cuft of nodular muddy sand and mud. Branching bryozoans and simple ascidians resembling small cindery balls, characterized the screenings. In addition to the species named in the chart, there were an anemone (7), a nemertean (2+), a sipunculid (1), *Glottidia albida* (4), an ascidian (3), and small crustaceans, especially amphipods.

Numbers of species and specimens totalled:

polychaetes	54 species,	300+ specimens
echinoderms	1	2+
mollusks	4+	8+
crustaceans	10+	many
others	6	12+
Total:	75+ species,	322+ specimens

Sta. 2175, in 58 fms. OPG took a small sample of mud and shell fragments, with many diversified animals. The polychaetes which were best represented included some not recovered in other samples, such as *Aphrodita refulgida*, *Magelona* with serrated prostomial margin, unidentified cirratulids, maldanid with parasitic copepod, ampharetids of several kinds, *Megalomma* sp., and spirorbids. The fauna may have affinities with that of the outer shelf.

Sta. 2174, in 161 fms. OPG took 0.95 cuft of mud with shell fragments. The largest animal was a large seastar, *Hippasteria* sp., accom-

panied by sea urchins (5), many small mollusks, numerous small crustaceans, and many diversified polychaetes, some not recovered elsewhere.

Sta. 2173, in 252 fms. OPG took 1.57 cuft of mud, with a nemertean, brissopsid urchins (2), a few ophiuroids, a small crustacean, and polychaetes including some not found elsewhere; they include *Anaitides* sp.; *Glycinde polygnatha*; *Lepidasthenia virens*; *Lumbrineris index*; *Oncoscolex pacificus*; *Prionospio* sp.; *Scalibregma inflatum*; *Thelepus* sp.

Sta. 2172, in 517 fms. OPG took 2.52 cuft of fine green mud with glass sponge, disklike foraminiferans, and animals differing from those in shallower depths. The largest individuals were a philinid mollusk (1), and a tube of *Maldane*, with lateral branches, measuring 30 mm long by 5 mm wide. Other animals were a pelecypod (3), an amphipod (1), an ovigerous isopod (1), and polychaetes: *Aricidea* sp., *Chaetozone* sp., *Drilonereis* sp., *Laonice* sp., *Lumbrineris index* (1), *Maldane* sp. with branched tube (4), *Ninoe* sp. and *Tharyx ?multifilis* (3).

Sta. 2170, in 587 fms. OPG took 2.9 cuft of fine mud with glass sponge spicules, many foraminiferans, and few animals. They were polychaetes with *Aricidea uschakowi* (several), *Onuphis* sp. (1), *Lumbrineris ?index* (1), a harmothoid (1), a terebellid (1); a small pelecypod and amphipods (few).

Palisades

1. Sta. 3610, in 20.5 fms. OPG took 0.5 cuft of gray muddy sand with black algal detritus, little sand and gravel, and many animals. Most abundant and conspicuous was *Glottidia albida* (50 large, measuring to 27 mm long, and 4 small, only 9 mm long). In addition to the species named in the chart, there were a small ceriantharian (3), a large *Cerebratulus rubra* (1), ectoproct bryozoans, crustaceans with an amphipod (2), a cumacean (1), a spider crab (1 jv), a box crab (1 jv), and a pinnotherid crab (1).

Numbers of species and specimens totalled:

polychaetes	28 species,	102 specimens
echinoderms	4	18
mollusks	5+	12+
crustaceans	5	6
others	4	59
Total:	46+ species,	197+ specimens

2. Sta. 3609, in 34.5 fms. OPG took 1.07 cuft of gray mud and fine sand with shell bits and conspicuous ophiuroids. The largest animal was

Cerebratulus rubra, and the most abundant *Amphiodia urtica* (144). In addition to those named in the chart, there were nemerteans (2), *Glottidia albida* (3), amphipods (many), an anthurid isopod (1).

Numbers of species and specimens totalled:

polychaetes	35 species,	158 specimens
echinoderms	4	171
mollusks	2	2+
crustaceans	+	+
others	2	5
Total:	43+ species,	336+ specimens

Polychaeta from Santa Catalina Island windward side
showing distributions by profiles,
from West End, Ribbon Rock, Catalina Harbor, Farnsworth Bank,
China Point-Salta Verde, and Palisades.
+ indicates presence, - absence.
Species represented by more than 10 specimens are indicated by *.

	West E.					R.R.		Cat. H.				F.B.		C+S		Pal.	
	1	2	3	4	5	1	2	1	2	3	4	1	2	1	2	1	2
Chaetopterus variopedatus	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Ampharete sp.	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+
ampharetids	.	*	-	+	+	+	+	-	+	-	-	-	-	+	-	-	-
Anaitides madeirensis	.	+	-	+	+	-	+	-	-	-	-	-	+	-	-	-	-
Anobothrus gracilis	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aricidea lopezi	.	+	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-
Aricidea spp.	.	*	-	+	+	+	+	+	-	-	-	-	-	+	+	+	+
Armandia bioculata	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Artacamella hancocki	.	+	-	-	+	-	-	-	+	-	-	-	-	+	+	-	-
Chaetozone armata	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloeia pinnata	.	+	-	*	*	-	-	-	-	-	-	-	+	-	-	-	+
Chone gracilis or C. sp.	.	*	-	+	-	+	-	-	-	-	-	+	-	-	+	+	-
Cirrophorus furcatus	.	+	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-
Cossura candida	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Drilonereis spp.	.	+	-	+	+	-	-	-	+	-	-	+	-	+	+	+	-
Eteone sp.	.	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
Euchone sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Eulalia myriacyclum	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eurysyllis americana	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Exogone uniformis	.	+	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-
Glycera americana	.	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-
Glycera spp.	.	+	-	+	-	-	+	-	-	-	-	-	+	-	+	+	+
Goniada brunnea	.	*	-	-	-	+	+	-	+	+	+	-	-	-	+	+	+
Gyptis a. glabra	.	+	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-
Harmothoe lunulata	.	+	-	-	+	-	-	-	+	+	-	-	-	-	-	+	+
Isocirrus longiceps	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Laonice cirrata	.	+	-	+	+	+	+	-	+	+	-	-	+	+	-	-	-
Lepidasthenia ?longicirrata	+	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-

Polychaeta from Santa Catalina Island windward side (continued)

	West E.					R.R.		Cat. H.				F.B.		C+S		Pal.	
	1	2	3	4	5	1	2	1	2	3	4	1	2	1	2	1	2
Loandalia fauveli	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loimia montagui	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineris spp.	.	*	-	+	+	+	*	-	+	+	*	-	+	*	+	*	*
Lysippe annectens	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Magelona ?pacifica	.	+	-	-	+	+	+	-	-	-	+	-	-	-	+	-	-
Melinna denticulata	.	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-	+
Myriochele gracilis	.	+	-	+	-	-	+	-	+	+	+	-	+	-	-	-	+
Nephtys spp.	.	+	-	-	-	+	-	-	-	+	-	-	+	+	+	+	-
Nereis procera	.	+	-	-	-	-	-	+	+	+	-	-	-	-	-	+	-
Nerinides sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nothria iridescens	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Notomastus latericeus	.	+	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-
Owenia f. collaris	.	+	-	-	-	-	-	-	-	-	-	+	*	+	+	-	-
Paraonis gracilis	.	*	-	-	-	+	+	*	*	-	+	-	+	-	+	-	-
Peisidice aspera	.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
Pholoe glabra	.	+	-	+	-	-	+	-	+	+	+	-	+	+	-	+	+
Phyllochaetopterus limicolus	.	+	-	-	-	+	*	-	-	-	-	-	-	-	+	-	-
Pista spp.	.	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-
Praxillella a. pacifica	.	+	-	-	-	-	*	*	+	-	+	-	-	+	-	-	+
Prionospio malmgreni	.	+	-	+	-	+	*	*	*	-	+	-	+	-	*	+	-
Prionospio pinnata	.	+	-	-	-	-	+	+	+	+	+	-	-	+	+	+	+
Prionospio pygmaeus	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Protodorvillea gracilis	.	+	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-
Scalibregma inflatum	.	+	-	-	+	+	-	-	+	-	+	-	-	+	*	-	-
Scoloplos sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Spio punctata	.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+
Sphaerodorum sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sphaerosyllis sp.	.	+	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-
Sthenelanella uniformis	.	+	-	+	-	-	+	+	*	-	-	-	-	*	*	-	+
Streblosoma crassibranchia	.	+	-	-	-	-	-	-	+	-	-	-	-	*	*	+	-
syllids	.	+	-	-	-	-	-	-	-	-	-	+	+	-	+	-	-

Polychaeta from Santa Catalina Island windward side (continued)

	West E. 1	2	3	4	5	R.R. 1	2	Cat. H. 1	2	3	4	F.B. 1	2	C+S 1	2	Pal. 1	2
Telepsavus costarum	.	+	-	+	-	-	*	-	+	+	+	-	+	-	-	-	+
Terebellides stroemii	.	+	-	-	+	-	-	-	+	-	+	-	-	+	+	-	+
Tharyx monilaris	.	+	-	-	-	-	-	*	+	-	+	-	+	+	-	-	+
Tharyx tesselata	.	*	-	+	+	-	+	-	-	+	+	-	-	+	-	+	+
Vermiliopsis sp.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aglaophamus sp.	.	.	+	+	-	+	-	-	-	-	-	-	-	-	-	-	+
Ammotrypane aulogaster	.	.	+	+	+	-	-	-	+	-	-	-	-	-	-	-	-
capitellids	.	.	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-
cirratulids	.	.	+	-	-	+	-	-	-	-	-	-	-	-	*	-	-
Haploscoloplos elongatus	.	.	+	+	*	-	-	+	*	+	-	-	+	+	+	+	+
Harmothoe spp.	.	.	+	-	-	+	+	-	-	-	+	-	-	+	-	-	-
Nereis spp.	.	.	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-
onuphid	.	.	+	-	-	-	-	-	-	-	-	-	-	-	+	-	+
phyllodocid	.	.	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-
sabellid	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
terebellids	.	.	+	-	-	-	-	+	-	+	-	-	+	-	-	-	-
Amage anops	.	.	.	+	-	-	+	-	-	+	-	-	-	+	-	-	*
Amphicteis scapho-branchiata	.	.	.	+	-	-	-	-	-	-	+	-	-	-	-	-	-
Maldane sarsi	.	.	.	+	-	+	+	-	+	-	+	-	-	-	-	-	+
maldanids	.	.	.	+	-	+	+	-	-	-	-	-	-	+	+	-	-
Nerinides maculata	.	.	.	+	+	-	-	*	-	-	-	-	-	+	-	-	+
Nothria conchylega	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Nothria stigmatis	.	.	.	*	*	-	-	-	-	-	-	-	+	-	-	-	-
Onuphis parva	.	.	.	+	*	-	-	-	+	+	+	-	-	+	-	-	-
Onuphis ?vexillaria	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Pectinaria californiensis	.	.	.	+	-	+	+	-	*	+	+	-	-	+	-	+	+
Pherusa neopapillata	.	.	.	+	-	-	-	-	-	-	-	-	-	-	-	+	-
Pista cf. cristata	.	.	.	*	+	-	*	-	-	+	-	-	+	+	-	-	-
Thalenessa spinosa	.	.	.	+	+	+	-	-	-	-	+	-	-	-	-	-	-
Travisia spp.	.	.	.	+	-	+	+	-	+	-	+	-	-	-	+	-	+
Amaeana occidentalis	.	.	.	.	+	-	-	+	-	-	-	-	-	+	+	-	+

Polychaeta from Santa Catalina Island windward side (continued)

	West E. 1 2 3 4 5	R.R. 1 2	Cat. H. 1 2 3 4	F.B. 1 2	C+S 1 2	Pal. 1 2
?Euclymene sp.	. . . . +	- -	- - - -	- -	- -	- -
nephtyid	. . . . +	- -	- - - -	- -	- -	- -
Travisia ?gigas	. . . . +	- -	- - - -	- -	- -	- +
Ancistrosyllis spp.	. . . . .	+ -	- - - -	- -	- -	- -
Arctonoe sp.	. . . . .	+ -	- - - -	- -	- -	- -
Diopatra ?splendidissima	. . . . .	+ -	- - - -	- -	- -	- -
Pherusa capulata	. . . . .	+ -	- + - -	+ -	+ -	+ -
Poecilochaetus johnsoni	. . . . .	+ -	- * + -	- -	+ +	- -
Rhodine bitorquata	. . . . .	+ +	- - - +	- -	- +	- +
Spiophanes spp.	. . . . .	+ +	- - - -	- -	* *	+ +
Sternaspis fossor	. . . . .	+ +	- + - +	- -	+ *	+ *
Brada pluribranchiata	. . . . .	. +	- - + +	- -	- -	- -
Prionospio cirrifera	. . . . .	. +	- - + +	- +	- -	- -
Sthenelais tertiaglabra	. . . . .	. +	- - + -	- -	+ -	- -
Anaitides sp.	. . . . .	. .	+ - - -	+ -	- -	- -
Apistobranchus ornatus	. . . . .	. .	+ - - -	- -	- -	- -
Armandia bioculata	. . . . .	. .	+ - - -	- -	- -	- -
Dorvillea articulata	. . . . .	. .	+ + - -	- -	- -	- -
Lumbrineris limicola	. . . . .	. .	* - - -	- -	- -	- -
Lumbrineris minima	. . . . .	. .	* - - -	- -	- -	- -
Mediomastus californiensis	. . . . .	. .	+ + - -	- -	- -	- -
Aglaophamus dicirris	. . . . .	. .	. + - -	- -	+ +	+ -
Aricidea uschakowi	. . . . .	. .	. + - -	+ -	- -	- -
Capitella capitata subsp.	. . . . .	. .	. + - -	+ -	- -	- -
Caulleriella sp.	. . . . .	. .	. + - -	- -	- -	- -
Euchone incolor	. . . . .	. .	. + - -	- -	- -	- -
Eumida, bilineate	. . . . .	. .	. + + -	- -	- -	- -
hesionid	. . . . .	. .	. + + -	- -	- -	- -
Hesperonoe sp.	. . . . .	. .	. + + -	- -	- -	- -
Langerhansia heterochaeta	. . . . .	. .	. + - -	- -	- -	- -
Lumbrineris pallida	. . . . .	. .	. * - -	- -	- -	- -

Polychaeta from Santa Catalina Island windward side (continued)

	West E. 1 2 3 4 5	R.R. 1 2	Cat. H. 1 2 3 4	F.B. 1 2	C+S 1 2	Pal. 1 2
Nephtys ferruginea	. . . . .	. .	. * - -	- -	- -	+ +
Nerinides pigmentata	. . . . .	. .	. + - -	- -	- -	- -
Notomastus tenuis	. . . . .	. .	. + - -	- -	- -	- -
Odontosyllis phosphorea	. . . . .	. .	. + - -	- +	- -	- -
Polycirrus sp.	. . . . .	. .	. + + -	+ +	* -	- -
Polydora sp.	. . . . .	. .	. + - -	- -	- +	- -
Rhynchopsio sp.	. . . . .	. .	. + + -	- -	- -	- -
Tharyx ?multifilis or T. sp.	. . . . .	. .	. + - -	- -	- *	- -
Ceratocephale c. americana	. . . . .	. .	. . + -	- -	- -	- -
Dorvillea moniloceras	. . . . .	. .	. . + -	- -	- -	+ -
Glycera capitata	. . . . .	. .	. . + -	- -	- -	- -
Pista disjuncta	. . . . .	. .	. . + -	- -	- -	- -
Praxillella gracilis	. . . . .	. .	. . + -	- -	- -	- -
Praxillella, collared	. . . . .	. .	. . + -	- -	- -	- -
Eunice sp.	. . . . .	. .	. . . +	- -	- -	- -
Laonice sp.	. . . . .	. .	. . . +	- -	- -	- -
Lumbrineris cruzensis	. . . . .	. .	. . . +	- -	- -	- -
Lumbrineris index	. . . . .	. .	. . . +	- -	- -	- -
Nephtys cornuta	. . . . .	. .	. . . +	- -	- -	- -
Nephtys glabra	. . . . .	. .	. . . +	- -	- -	- -
Spiophanes fimbriata	. . . . .	. .	. . . +	- -	- -	- -
Autolytus sp.	. . . . .	. .	. . . .	+ -	- -	- -
Halosydna sp.	. . . . .	. .	. . . .	+ -	- -	+ -
Harmothoe extenuata	. . . . .	. .	. . . .	* -	- -	- -
Laeospira ?borealis	. . . . .	. .	. . . .	+ -	- -	- -
Platynereis bicanaliculata	. . . . .	. .	. . . .	+ -	- -	- -
Arabella sp.	. . . . .	. .	. . . .	. +	- -	- -
Armandia sp.	. . . . .	. .	. . . .	. +	- -	- -
Aricidea neosuecica	. . . . .	. .	. . . .	. *	- -	- -
Caulleriella alata	. . . . .	. .	. . . .	. +	- -	- -
Dodecaceria sp.	. . . . .	. .	. . . .	. +	- -	- -

Polychaeta from Santa Catalina Island windward side (continued)

	West E. 1 2 3 4 5	R.R. 1 2	Cat. H. 1 2 3 4	F.B. 1 2	C+S 1 2	Pal. 1 2
Eurythoe complanata	. . . . .	. .	. . . .	. +	- -	- -
Exogone sp.	. . . . .	. .	. . . .	. +	- +	- -
Genetyllis sp.	. . . . .	. .	. . . .	. +	- -	- -
Harmothoe hirsuta	. . . . .	. .	. . . .	. *	- -	- -
Hesione sp.	. . . . .	. .	. . . .	. +	- -	- -
Hesionura c. difficilis	. . . . .	. .	. . . .	. *	- -	- -
Lepidonotus sp.	. . . . .	. .	. . . .	. +	- -	- -
Lumbrineris acuta	. . . . .	. .	. . . .	. +	- -	- -
Lumbrineris japonica	. . . . .	. .	. . . .	. +	- -	- -
Lumbrineris latreilli	. . . . .	. .	. . . .	. +	- -	- -
Lysidice ninetta	. . . . .	. .	. . . .	. +	- -	- -
Magelona sp.	. . . . .	. .	. . . .	. +	+ -	- -
maldanid, collared	. . . . .	. .	. . . .	. +	- -	- -
Nereis ?neonigripes	. . . . .	. .	. . . .	. +	- -	- -
Nerine sp.	. . . . .	. .	. . . .	. *	- -	- -
Ophiodromus pugettensis	. . . . .	. .	. . . .	. +	- -	- -
Orseis sp.	. . . . .	. .	. . . .	. *	- -	- -
Pareurythoe californica	. . . . .	. .	. . . .	. +	- -	- -
Pherusa papillata	. . . . .	. .	. . . .	. +	- -	- -
Pisione remota	. . . . .	. .	. . . .	. *	- -	- -
Prionospio sp.	. . . . .	. .	. . . .	. *	+ -	- +
Psammolyce spinosa	. . . . .	. .	. . . .	. +	- -	- -
Questa caudicirra	. . . . .	. .	. . . .	. *	- -	- -
Salmacina dysteri	. . . . .	. .	. . . .	. +	- -	- -
Scoloplos acmeceps	. . . . .	. .	. . . .	. +	- -	- -
serpulids	. . . . .	. .	. . . .	. +	- -	- -
Spiophanes bombyx	. . . . .	. .	. . . .	. +	- -	- -
spirorbids	. . . . .	. .	. . . .	. +	- -	- -
Vermiliopsis biformis	. . . . .	. .	. . . .	. +	- -	- -
Asychis lacera	. . . . .	. .	. . . .	. .	+ -	- -
Cirriformia spirabrancha	. . . . .	. .	. . . .	. .	+ -	- -

Polychaeta from Santa Catalina Island windward side (continued)

	West E. 1	2	3	4	5	R.R. 1	2	Cat. H. 1	2	3	4	F.B. 1	2	C+S 1	2	Pal. 1	2
Goniada sp.														+	-	-	-
Sthenelais verruculosa														+	-	-	-
Ampharete arctica															+	-	-
Amphisamytha bioculata															+	-	-
Aphrodita armifera															+	-	-
Diopatra tridentata															+	-	-
Dorvillea articulata															+	-	-
Eulalia bilineata															+	-	-
Eulalia spp.															+	-	-
Lanice sp.															+	-	-
Megalomma sp.															+	-	-
Nephtys californiensis															+	-	-
Pherusa sp.															+	-	-
Pseudopotamilla sp.															+	-	-
Rhamphobrachium longisetosum															+	-	-
Sabella ?crassicornis															+	-	-
Sabella, another sp.															+	-	-
sigalionid															+	-	-
Chaetozone sp.																+	-
Notomastus ?magnus																+	-
Potamilla, oculate																+	-
Myriowenia californiensis																	+

Echinodermata from Santa Catalina Island windward side, showing distributions by profiles, from West End, Ribbon Rock, Catalina Harbor, Farnsworth Bank, China Point-Salta Verde, and Palisades.

	West E.					R.R.		Cat. H.				F.B.		C+S		Pal.	
	1	2	3	4	5	1	2	1	2	3	4	1	2	1	2	1	2
Amphiacantha amphacantha	.	+	-	+	-	-	+	-	-	+	+	-	-	+	-	-	-
Amphipholis squamata	.	+	-	-	+	-	*	-	+	+	-	*	*	+	-	-	+
Leptosynapta albicans	.	+	-	-	-	-	*	-	+	-	+	-	-	-	-	+	-
Lytechinus anamesus	.	+	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-
ophiuroids	.	*	-	-		-	-	-	-	-	-	-	-	-	-	-	-
Amphiodia digitata	.	*	-			-	-	-	-	-	-	-	-	-	-	-	-
Amphioplus hexacanthus	.	+	-			-	-	-	-	-	-	-	-	-	-	-	-
Brissopsis pacifica	.	+	-			-	-	-	+	-	-	-	-	-	-	-	-
Amphiodia urtica	.	*				-	-	-	*	*	+	-	*	+	-	+	*
asteroids	.					+	-	-	-	-	-	-	-	-	-	-	-
holothuroids	.					+	-	-	-	-	-	-	-	-	-	-	-
Luidia foliolata	.					+	-	-	-	-	-	-	-	-	-	-	-
Ophiothrix spiculata	.					+	-	-	-	+	-	*	*	-	-	-	-
Amphioplus strongyloplax	.					-	+	-	-	-	*	-	-	-	-	-	-
Pentamera pseudo-populifera	.					-	+	-	-	+	-	-	-	-	-	+	-
Amphipholis pugetana	.					.	.	.	*	-	-	+	*	-	-	-	-
Amphiura arcystata	.					.	.	.	+	*	-	-	-	-	-	-	*
Astropecten californicus	.					.	.	.	+	-	-	-	-	+	-	+	-
Lovenia cordiformis	.					.	.	.	+	-	-	-	-	-	-	-	-
Ophiacantha diplasia	.					.	.	.	+	-	-	-	-	-	-	-	-
Ophiocynodus corynetes	.					.	.	.	+	-	-	-	-	-	-	-	-
Ophiopholis longispina	.					.	.	.	*	-	-	-	-	-	-	-	-
Leptosynapta sp.	.					.	.	.	.	+	-	-	-	-	-	-	-
Molpadia intermedia	.					.	.	.	.	.	+	-	-	-	-	-	-
Ophiomusium jolliensis	.					.	.	.	.	.	+	-	-	-	-	-	-
Henricia sp.	.					.	.	.	.	.	.	+	-	-	-	-	-
Ophiopteris papillosa	.					.	.	.	.	.	.	*	+	-	-	-	-
Asterina miniata	.					.	.	.	.	.	.	.	+	-	-	-	-
Ophiopsila californica	.					.	.	.	.	.	.	.	+	-	-	-	-

Echinodermata from Santa Catalina Island windward side (continued)

	West E. 1	2	3	4	5	R.R. 1	2	Cat. H. 1	2	3	4	F.B. 1	2	C+S 1	2	Pal. 1	2
Ophiura lutkeni														+	-	-	-
purple holothuroid														*	+	-	*

Mollusca from Santa Catalina Island windward side, showing distributions by profiles, from West End, Ribbon Rock, Catalina Harbor, Farnsworth Bank, China Point-Salta Verde, and Palisades.

gastropods	.	+	-	-	-	+	-	-	-	-	-	*	+	-	-	+	-
pelecypods	.	+	-	-	-	*	-	*	-	-	-	-	-	+	-	+	-
solenogaster	.	+	-	-	+	-	-	-	+	+	+	-	-	-	-	+	-
Pecten sp.	.	.	+	-	-	-	-	-	+	-	-	-	-	+	-	+	-
Tellina carpenteri	.	.	+	+	+	-	-	+	+	-	-	-	-	+	-	+	+
Cuspidaria sp.	.	.	.	.	+	+	+	-	-	-	-	-	-	-	-	-	-
Nassarius sp.	.	.	.	.	+	-	-	-	-	-	-	-	+	-	-	-	-
Antiplanes sp.	.	.	.	.	.	*	-	-	-	-	-	-	-	-	-	-	-
Cadulus spp.	.	.	.	.	.	+	-	-	-	+	+	-	-	-	-	-	-
Acila castrensis	.	.	.	.	.	.	+	-	-	+	+	-	-	-	-	-	-
Amygdalum pallidulum	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-
Epitonium sp.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-
Lima subauriculata	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-
Lucinoma annulata	.	.	.	.	.	.	+	-	-	-	-	-	-	-	-	-	-
Nemocardium sp.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-	-	-
Compsomyax subdiaphana	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	+	-
Thyasira sp.	.	.	.	.	.	.	.	.	+	-	+	-	-	-	-	-	-
Tellina idae	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-	-
Cardita ventricosa	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-	-
Calliostoma sp.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Conus californicus	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Hyalina sp. (olive-shell)	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Lima dehiscens	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Pedicularia californica	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-	-
Hinnites sp.	.	.	.	.	.	.	.	.	.	.	.	.	+	-	-	-	-

Mollusca from Santa Catalina Island windward side (continued)

	West E. 1 2 3 4 5	R.R. 1 2	Cat. H. 1 2 3 4	F.B. 1 2	C+S 1 2	Pal. 1 2
Kellia sp.	. . . . .	. .	. . . .	. +	- -	- -
Saxicava arctica	. . . . .	. .	. . . .	. +	- -	- -
vermetid	. . . . .	. .	. . . .	. *	- -	- -
Aglaja sp.	. . . . .	. .	. . . .	. .	+ -	- -
Nuculana taphria	. . . . .	. .	. . . .	. .	* -	- -
nudibranch	. . . . .	. .	. . . .	. .	+ +	- -
Siliqua lucida	. . . . .	. .	. . . .	. .	+ -	- -
turret-top	. . . . .	. .	. . . .	. .	+ -	- -
Crepidula sp.	. . . . .	. .	. . . .	. .	. +	- -
Solen sp.	. . . . .	. .	. . . .	. .	. .	+ -

PHOTOGRAPHIC RECORDS ALONG THE LEEWARD SIDE OF SANTA CATALINA ISLAND

The sea bottoms on the leeward side of Santa Catalina Island were sampled with a Campbell grab equipped with camera. I am indebted to Professor K. O. Emery, Woods Hole Oceanographic Institution, for the copies of the photographs. The methods for taking the samples were like those described in the canyon report (Hartman, 1963, p. 102). The Campbell grab, with coverage of about a fourth of a square meter, was equipped with camera and lights, and lowered so that the size of the photograph and the surface taken by the grab were about equal. There was reasonable agreement with what the pictures revealed, and the numbers and kinds of larger surface organisms taken in the grab.

The locations of photographs and their analyses are listed in the chart and summaries, below.

1. Sta. 7707 (N of no. 250), off Abalone Pt., in 22.5 fms. The photograph (Pl. 8, top) shows numerous slender, projecting tubes of *Telepsavus costarum*, and larger, recumbent tubes of *Chaetopterus variopedatus* (the largest tubes measured 225 by 18 mm); three echinoids and two cone-snails are seen on the surface. The largest animals in the sample are shown (Pl. 8, bottom). Analyses revealed the presence of 21 species and 155 specimens; in addition to those listed in the chart (see below), there were bryozoan clusters, an amphipod (1), a commensal crab (1) and an ascidian. Largest were *Chaetopterus* and *Lytechinus*.

2. Sta. 7719 (N of no. 250). Shelf off Abalone Pt., in 23.5 fms. The photograph (Pl. 9, top) shows a silty surface interrupted by two tubes of *Chaetopterus variopedatus*, distal ends of slenderer tubes of *Telepsavus costarum*, and *Lytechinus anamesus*. Other animals in the sample resemble those from Sta. 7707. The photographs appear different because the surface is more completely silt-covered in the second than in the first.

3. Sta. 7720 (N of no. 253). Shelf off Abalone Pt., in 23.5 fms. The photograph (Pl. 9, bottom) shows a bottom similar to that in the preceding one, except for the presence of a seastar, *Mediaster aequalis*. *Chaetopterus* and *Telepsavus* were the most prominent organisms.

4. Sta. 7723 (near no. 250). Shelf off Jewfish Pt., in 39.5 fms. The photograph (Pl. 10, top) shows a level silty bottom, with rocks projecting at lower left, overgrown by solitary corals, and a smaller clump of the same in the upper left-hand corner; an ophiuroid arm is seen in upper right, and the surface shows pittings of smaller organisms embedded in

the sediments. The grab failed to penetrate the bottom, perhaps because the jaws struck hard rock before they closed.

5. Sta. 7725 (near no. 250). Shelf off Jewfish Pt., in 40.5 fms. The photograph (Pl. 10, bottom) shows a silty surface with a few long, ophiuroid arms, many small pits, mounds and low ridges. The sample contained an echinoid and numerous polychaete tubes, together with a ceriantharian (8), a sipunculid burrowing in the foraminiferan, *Rhabdamina* (2), a chaetognath (15), amphipods (65), a gnathid isopod (1), an anthurid isopod (1), tanaids (12), cumaceans (22), ostracods (41), a shrimp (3), a pycnogonid (2), in addition to those named in the chart. The most abundant species were *Aricidea neosuecica* (42) and *Aricidea lopezi* (25).

6. Sta. 7726 (near no. 251). Shelf off Jewfish Pt., in 40 fms. The photograph (Pl. 11, top) shows silty sediments overlain by dead shells of *Laqueus californicus*. Analyses of the sample revealed the presence of more than 100 species and 300 specimens. In addition to those named in the chart, the sample contained a ceriantharian (3), a solitary coral (2), a hydroid stalk (1), a nemertean (1), a polyclad (1), a sipunculid (1), a phoronid (1), encrusting bryozoans, amphipods of numerous kinds (60+), a caprellid (1), isopods (5), tanaids (14), cumaceans (3), three kinds of ostracods (13), a shrimp (5), an oxyrhynch crab (3), *Scalpellum* (1) attached to *Phyllochaetopterus* tube. The largest animals were *Euclymene* sp. (Pl. 11, bottom) and dead shells of *Laqueus*. The most abundant species was *Peisidice aspera* (17).

7. Sta. 7712 (near no. 260). Slope SE end of Santa Catalina Island, in 133 fms. The photograph (Pl. 12, top) shows a coarse black sandy bottom, its surface marked with a broad, shallow, depressed trail in the lower half, a patch of ophiuroid arms in center right, and the surface pitted with pores, mounds and other irregularities. The largest animals were *Brissopsis pacifica*, (Pl. 12, bottom), *Eunice americana*, *Nothria iridescens*, *Maldane sarsi* and tubes of *Phyllochaetopterus limicolus*. In addition to those named in the chart, there were a ceriantharian (1), a nemertean (1), a sipunculid (2), amphipods of several kinds (12), an anthurid isopod (1), a tanaid (3), a cumacean (1), and three kinds of ostracods (43). None was conspicuously abundant.

8. Sta. 7727 (near no. 251). Shelf off Jewfish Pt., in 44 fms. The grab failed to take a sample. The photograph (Pl. 13, top) reveals a silty sand surface riddled by pores and depressions, suggesting the presence of many animals.

9. Sta. 7713 (near no. 267). Basin slope, SE of Santa Catalina Island, in 286 fms. The sediments were black sand and gravel with silt. The photograph (Pl. 13, bottom) showed no large surface animals, but many small to large pores, mounds, trails and white shelly fragments. The analyses disclosed the presence of 32 species and 139 specimens. In addition to those named in the chart, there were glassy sponge spicules, a sea-whip with bulbous base (1), a nemertean (1), an echiuroid with anterior end lightly papillated (1), amphipods (3), a caprellid (1), a cumacean (1), and an ostracod (1). Capsules of unknown origin, measuring 4 by 1.2 mm, surrounded by a chitinized layer, were filled with uniformly minute, spherical granules. The most abundant species were *Paraonis gracilis oculata* (62), and *Crystallophrisson* sp. (15), and the largest individuals were *Scalibregma inflatum* and an echiuroid.

Polychaeta on photographic records
from the leeward side of Santa Catalina Island,
showing order of occurrence in 22.5 to 268 fms.
+ indicates presence, - absence.
Species represented by more than 10 specimens are indicated by *.

	1	2	3	4	5	6	7	8	9
Aglaophamus dicirris	+	-	-	-	-	-	-	-	-
Anaitides, checkered	+	-	-	-	-	-	-	-	-
Aphrodita sp.	+	-	-	-	-	-	-	-	-
Chaetopterus variopedatus	*	+	+	-	-	-	-	-	-
Langerhansia heterochaeta	+	-	-	-	-	-	-	-	-
Lepidasthenia sp.	+	-	-	-	-	-	-	-	-
Owenia f. collaris	+	+	+	-	-	-	-	-	-
Telepsavus costarum	*	-	-	-	+	+	-	+	-
terebellid	+	-	-	-	-	+	-	-	-
Amphicteis scaphobranchiata					+	-	-	-	-
Aricidea lopezi					*	+	*	*	+
Aricidea neosuecica					*	+	*	-	-
Aricidea uschakowi					*	-	*	+	+
Chaetozone setosa					+	+	-	-	-
Chone sp.					+	+	+	-	-
Eteone ?californiensis					+	-	-	-	-
goniadid					+	+	-	-	-
Harmothoe lunulata					+	+	-	-	-
Lumbrineris bicirrata					+	-	+	-	-
Myriowenia californiensis					+	-	-	-	-
Nephtys cornuta					*	-	-	-	-
Nephtys ferruginea					+	-	+	-	-
Nerinides pigmentata					+	+	+	-	-
Nothria iridescens					+	-	-	+	-
Onuphis parva					+	-	-	+	-
Paraonis gracilis					+	+	+	+	-
Pectinaria californiensis					+	-	+	+	-
Pherusa neopapillata					+	-	-	-	-
Pholoe glabra					+	+	+	+	-

Polychaeta on photographic records (continued)

	1	2	3	4	5	6	7	8	9
Polydora sp.					+	+	-	-	-
Rhodine bitorquata					+	-	-	-	-
Spio punctata					+	-	+	-	-
Sthenelais tertiaglabra					+	-	-	-	-
Sthenelanella uniformis					+	+	+	-	-
Terebellides stroemii					+	+	-	-	-
Thalenessa spinosa					+	-	+	-	-
Tharyx monilaris					+	+	-	+	+
Aglaophamus sp.						+	-	+	-
Amaeana occidentalis						+	+	-	-
Ammotrypane sp.						+	-	-	-
Anaitides sp.						+	-	-	-
Autolytus sp.						+	-	-	-
Euclymene sp.						+	-	-	-
Eulalia myriacyclum						+	-	-	-
Euphrosine sp.						+	-	-	-
Exogone uniformis						+	+	+	-
Flabelligera infundibularis						+	-	-	-
Glycera americana						+	-	-	-
Glycera cf. capitata						*	-	-	-
Lanice sp.						+	-	-	-
Laonice foliata						+	-	+	-
Lepidonotus caelorus						+	-	-	-
Lumbrineris cruzensis						+	+	+	-
Lumbrineris, other sp.						*	-	-	-
Magelona pacifica						+	-	+	-
Mediomastus californiensis						+	-	-	-
Notoproctus cf. pacificus						+	-	-	-
Odontosyllis phosphorea						+	-	-	-
Ophiodromus pugettensis						+	-	-	-
Peisidice aspera						*	-	-	-

Polychaeta on photographic records (continued)

	1	2	3	4	5	6	7	8	9
Pherusa capulata						+	-	-	-
Phyllochaetopterus prolifica						+	-	-	-
Platynereis bicanaliculata						+	-	-	-
Polycirrus sp.						+	+	-	-
Praxillella sp.						+	-	-	-
Prionospio malmgreni						*	-	+	-
Prionospio pinnata						+	+	+	+
Pseudopotamilla occelata						+	-	-	-
Scalibregma inflatum						+	-	-	+
Tharyx tesselata						+	-	+	-
Vermiliopsis biformis						+	-	-	-
other serpulid						+	-	-	-
Myriochele gracilis							+	+	+
Prionospio pygmaeus							+	-	-
Spiophanes sp.							+	-	-
Sternaspis fossor							+	-	-
Tharyx spp.							*	-	-
Ampharete sp.								+	-
Cirrophorus aciculatus								+	-
Cossura candida								+	-
Eunice americana								+	-
Goniada brunnea								+	-
Maldane sarsi								*	+
Notomastus sp.								+	-
Pherusa sp.								+	-
Phyllochaetopterus limicolus								*	-
Prionospio cirrifera								+	-
Spiophanes fimbriata								+	-
Ancistrosyllis tentaculata									+
Anobothrus gracilis									+
Brada glabra									+

Polychaeta on photographic records (continued)

	1	2	3	4	5	6	7	8	9
Brada pluribranchiata									+
Califia calida									+
Glycera branchiopoda									+
Gyptis a. glabra									+
Harmothoe sp.									+
Nephtys sp.									+
Notomastus magnus									+
Paraonis g. oculata									*
Praxillella a. pacifica									+

Echinodermata on photographic records from the leeward side of Santa Catalina Island, showing order of occurrence in 22.5 to 268 fms.

Lytechinus anamesus	+	+	-	-	+	-	-	-	-
Ophiothrix spiculata	+	-	-	-	-	+	+	-	-
Mediaster aequalis			+	-	-	-	-	-	-
ophiuroids				+	+	*	*	*	-
Amphiodia urtica					*	-	-	-	+
holothurian					+	-	-	-	-
seastar					+	-	+	-	-
Leptosynapta albicans						+	+	-	+
Brissopsis pacifica								+	-
Amphipholis squamata									+

Mollusca on photographic records from the leeward side of Santa Catalina Island, showing order of occurrence in 22.5 to 268 fms.

	1	2	3	4	5	6	7	8	9
Compsomyax subdiaphana	+	-	-	-	-	-	-	-	-
Conus californicus	+	-	-	-	-	-	-	-	-
Pecten sp.	+	-	-	-	-	-	-	-	-
Amygdalum pellucidum				+	-	-	+	-	-
Cadulus tolmiei				+	-	-	-	-	-
gastropods				+	-	+	-	-	-
Nemocardium sp.				+	-	+	-	-	-
pelecypods				+	-	+	-	-	-
Balcis sp.						+	-	-	-
chiton						+	-	-	-
Cyclopecten sp.						+	-	-	-
Nassarius sp.						+	-	-	-
seaslug						+	-	-	-
Tellina sp.						+	-	-	-
Axinopsida serricata							+	+	-
Crystallophrisson sp.							+	-	+
Dacrydium pacifica							+	-	-
turret -top							+	-	-
Cadulus sp.								+	-
Protochaetoderma sp.									+
scaphopod									+

ALPHABETICAL LISTS OF SPECIES NAMED FROM THESE AREAS

POLYCHAETES

Aedicira ramosa (Annenkova); SP, CL
Aglaophamus dicirris Hartman; CL, CW
Aglaophamus erectans Hartman; SP
Aglaophamus spp.; SP, LS, CL
Amaeana occidentalis (Hartman); PV, SP, NE, CL, CW
Amage anops (Johnson); PV, SP, CL, CW
Ammotrypane aulogaster Rathke; SP, LS, CL, CW
Ammotrypane sp.; SP, LS, CL
Ampharete arctica Malmgren; PV, SP, CL, CW
Ampharete labrops Hartman; PV
Ampharete spp.; PV, SP, CL
Amphicteis mucronata Moore; SP, CL
Amphicteis scaphobranchiata Moore; PV, SP, NE, LH, CL, CW
Amphicteis spp.; SP, CL
Amphiduros pacificus Hartman; PV
Amphisamytha bioculata (Moore); CL, CW
Anaitides madeirensis (Langerhans); PV, SP, LS, CL, CW
Anaitides medipapillata (Moore); PV, SP, CL
Anaitides, checkered; SP, NE, LH, CL
Anaitides spp.; PV, SP, NE, LS, CL, CW
Ancistrosyllis cf. *bassi* Hartman; SP
Ancistrosyllis breviceps Hartman; CL
Ancistrosyllis cf. *rigida* Fauvel; SP, NE
Ancistrosyllis tentaculata Treadwell; LH, PV, SP, NE, CL, CW
Ancistrosyllis spp.; LH, SP, LS
Anobothrus gracilis (Malmgren); SP, LS, CL, CW
Anotomastus gordiodes (Moore); LH, PV, SP, NE
Antinoella sp.; PV, SP
Aphrodita armifera Moore; SP, CW
Aphrodita parva Moore; CL
Aphrodita refulgida Moore; PV
Aphrodita spp.; PV, SP, CL

Apistobranchus ornatus Hartman; SP, CW
Apomatus geniculata (Moore and Bush); CL
Arabella semimaculata (Moore); SP
Arabella sp.; SP, CW
Arctonoe sp.; CL, CW
Aricidea lopezi Berkeley and Berkeley; LH, PV, SP, NE, LS, CL, CW
Aricidea neosuecica Hartman; PV, SP, NE, CL, CW
Aricidea uschakowi Zachs; PV, SP, NE, CL, CW
Aricidea spp.; LH, PV, SP, LS, CL, CW
Armandia bioculata Hartman; LH, PV, SP, CL, CW
Artacamella hancocki Hartman; PV, SP, NE, CL, CW
Asabellides lineata (Berkeley and Berkeley); NE
Asabellides sp.; PV, NE
Asclerocheilus californicus Hartman; SP
Asclerocheilus sp.; CL
Asychis disparidentata (Moore); PV, SP
Asychis lacera (Moore); SP, CW
Asychis spp.; LH, PV, SP
Autolytus sp.; PV, SP, CW
Axiothella rubrocincta (Johnson); PV, SP, NE
Axiothella spp.; SP, NE, CL
Boccardia basilaria Hartman; PV
Boccardia nr. *redeki* (Horst); LH
Boccardia uncata Berkeley; PV
Boccardia spp.; PV, SP, LS
Brada glabra Hartman; SP, NE, LS, CL
Brada pilosa Moore; LH, PV, SP, NE, CL
Brada pluribranchiata (Moore); PV, SP, NE, CL, CW
Brada sp.; SP
Califia calida Hartman; SP, CL
Capitata ambiseta Hartman; PV
Capitella capitata (Fabricius), subspp.; PV, SP, LS, CL, CW
Capitellides sp.; PV
Capitomastus sp.; PV, SP
Carazzia sp.; LH
Caulleriella alata (Southern); PV, CW

Caulleriella bioculata (Keferstein); PV, SP
Caulleriella spp.; LS, CL, CW
Ceratocephala c. americana Hartman; PV, NE, SP, CW
Ceratocephala l. pacifica Hartman; SP
Ceratonereis sp.; SP
Chaetopterus variopedatus (Renier); PV, SP, NE, CL, CW
Chaetozone armata Hartman; LS, CL, CW
Chaetozone corona Berkeley and Berkeley; LH, PV, SP, NE, CL
Chaetozone gracilis (Moore); PV, SP
Chaetozone hamata (Hartman); SP
Chaetozone multioculata Hartman; CL
Chaetozone setosa Malmgren; PV, SP, CL
Chaetozone, oculate; PV
Chaetozone spp.; SP, CL, CW
Chloeia pinnata Moore; PV, SP, NE, LS, CL, CW
Chone ecaudata (Moore); LH, PV
Chone gracilis Moore; PV, SP, NE, CW
Chone minuta Hartman; SP
Chone mollis (Bush); PV, SP
Chone spp.; PV, SP, NE, CL, CW
Chrysopetalum occidentale Johnson; PV
Cirratulus cirratus (Müller); LH, PV, SP
Cirratulus sp.; CL
Cirriformia luxuriosa (Moore); LH, SP
Cirriformia spirabrancha (Moore); PV, SP, CW
Cirriformia sp.; CL
Cirrophorus aciculatus Hartman; PV, SP, LS, CL
Cirrophorus furcatus Hartman; LH, PV, SP, LS, CL, CW
Cistenides brevicoma (Johnson); PV, SP
Cossura candida Hartman; LH, PV, SP, NE, LS, CL, CW
Dasybranchus glabrus Moore; PV
Dasybranchus sp.; PV
Dexiospira sp.; CL
Diopatra ornata Moore; PV, SP, NE, CL
Diopatra ?splendidissima Kinberg; CW
Diopatra tridentata Hartman; LH, PV, SP, CL, CW

Diopatra sp.; CL
Distylidia rugosa (Moore); PV
Dodecaceria concharum Oersted; LS, CL
Dodecaceria spp.; PV, CL, CW
Dorvillea articulata (Hartman); LH, PV, SP, CL, CW
Dorvillea moniloceras (Moore); CW
Drilonereis longa Webster; PV, SP, LS
Drilonereis nuda Moore; LH, PV, SP
Drilonereis spp.; LH, PV, SP, NE, CL, CW
Eteone ?alba Webster; LH
Eteone californica Hartman; PV, SP
Eteone dilatae Hartman; SP
Eteone spp.; CL, CW
Euchone incolor Hartman; CW
Euchone spp.; PV, SP, LS, CL, CW
Euclymene reticulata Moore; PV, SP
Euclymene sp.; PV, SP, CL, CW
euclymenid; SP
Eulalia myriacyclum Schmarda; PV, SP, CL
Eulalia quadrioculata Moore; PV, SP
Eulalia, cross-barred; PV
Eulalia spp.; SP, CL
Eumida sanguinea (Oersted); PV, SP
Eumida tubiformis Moore; CL
Eumida, bioculate; PV, SP
Eumida, trilineate; PV, SP, CL
Eumida spp.; PV, SP, LS, CL
Eunice americana Hartman; PV, SP, NE, CL
Eunice antennata (Savigny), PV
Eunice aphroditois (Pallas); CL
Eunice sp.; LS, CL
?Eunoe sp.; CL
Euphrosine sp.; SP, CL
Eupolymnia crescentis Chamberlin; PV
Eupolymnia heterobranchia (Johnson); CL
Eupolymnia spp.; SP, CL

Eusyllis transecta n. sp.; SP
Euzonus (*Thoracophelia*) sp.; PV
Exogone uniformis Hartman; PV, SP, NE, LS, CL
Exogone spp.; PV, CL
Exogonella brunnea Hartman; PV, CL
EXOGONINAE; PV, SP
Fabricia pacifica Berkeley and Berkeley; CL
Fabricia spp.; LH, PV, SP, CL
Flabelligera commensalis Moore; PV, SP, CL
Flabelligera infundibularis Johnson; CL
Gattyana brunnea n. sp.; LS
Genetyllis castanea (Marenzeller); SP
Glycera americana Leidy; LH, PV, SP, NE, LS, CL
Glycera branchiopoda Moore; SP, LS, CL
Glycera ?capitata Oersted; LH, PV, SP, NE, LS, CL
Glycera convoluta Keferstein; NE
Glycera oxycephala Ehlers; SP, NE
Glycera robusta Ehlers; SP
Glycera tenuis Hartman; SP
Glycera tesselata Grube; LS, CL
Glycera spp.; PV, SP, LS, CL
Glycinde armigera Moore; SP, NE
Glycinde wireni Arwidsson; SP
Goniada brunnea Treadwell; LH, PV, SP, NE, LS, CL
Goniada littorea Hartman; LH, PV, SP, NE
Goniada sp.; SP
Gyptis arenicola glabra (Hartman); LH, PV, SP, NE, LS, CL
Gyptis brunnea (Hartman); PV
Gyptis sp.; SP
Halosydna brevisetosa Kinberg; PV, SP
Halosydna latior Chamberlin; SP, CL
Halosydna spp.; PV, CL
Haploscoloplos elongatus (Johnson); LH, PV, SP, NE, LS, CL
Haploscoloplos panamensis Monro; CL
Haplosyllis sp.; PV
Harmothoe ?fragilis Moore; CL

Harmothoe hirsuta Johnson; CL
Harmothoe cf. *imbricata* (Linnaeus); SP
Harmothoe lunulata (delle Chiaje); LH, PV, SP, NE, CL
Harmothoe priops Hartman; SP, NE
Harmothoe scriptoria Moore; PV, SP, CL
Harmothoe spp.; PV, SP, NE, CL
harmothoid; SP
Hesperonoe laevis Hartman; PV, SP
Hesperonoe sp.; SP, NE
Heteromastus filiformis (Claparede); PV
Heteropale bellis (Johnson); SP
Heterospio catalinensis (Hartman); PV, SP, NE, CL
Hyalinoecia juvenalis Moore; NE
?*Hyphagus* sp.; SP
Isocirrus longiceps (Moore); SP, NE
Isocirrus sp.; CL
?*Isolda* sp.; SP, CL
Lagisca nr. *multisetosa* Moore; LS
Lagisca sp.; SP
Langerhansia heterochaeta (Moore); PV, SP, CL
Lanice conchilega (Pallas); PV, SP, LS, CL
Lanice sp.; CL
Laonice cirrata (Sars); LH, PV, SP, NE, LS, CL
Laonice foliata (Moore); CL
Laonice sp.; SP
Leaena caeca Hartman; SP
Leanira sp.; NE
Leiochrides hemipodus Hartman; CL
Leiochrides sp.; CL
Lepidasthenia interrupta (Marenzeller); SP
Lepidasthenia longicirrata Berkeley; CL
Lepidasthenia virens (Blanchard); PV, SP, CL
Lepidasthenia spp.; PV, NE, CL
Lepidonotus caelorus Moore; PV, SP, LS, CL
Loandalia fauveli Berkeley and Berkeley; LH, PV, SP, NE
Loimia medusa (Savigny); PV, NE

Lumbriclymene lineus Hartman; SP
Lumbriclymene sp.; SP
Lumbrineris nr. *acuta* Verrill; PV, SP, NE, CL
Lumbrineris cf. *bassi* Hartman; PV
Lumbrineris bicirrata Treadwell; PV, SP, NE, CL
Lumbrineris bifilaris (Ehlers); NE
Lumbrineris californiensis Hartman; LH, PV, SP, NE, CL
Lumbrineris cruzensis Hartman; LH, PV, SP, NE, CL
Lumbrineris nr. *impatiens* (Claparède); CL
Lumbrineris index Moore; SP
Lumbrineris inflata Moore; PV
Lumbrineris japonica (Marenzeller); SP
Lumbrineris latreilli Audouin and Edwards; PV, SP, LS, CL
Lumbrineris limicola Hartman; LH, PV, SP
Lumbrineris pallida Hartman; LH, PV, SP
Lumbrineris nr. *sarsi* (Kinberg); SP
Lumbrineris ?tetraura (Schmarda); PV, SP
Lumbrineris spp.; PV, SP, NE, LS, CL
Lysippe annectens Moore; PV, SP, LS, CL
Macellicephala remigata (Moore); LS
Magelona ?californica Hartman; LS
Magelona pacifica Monro; PV, SP, NE, LS, CL
Magelona pitelkai Hartman; SP
Magelona sacculata Hartman; LH, SP, NE
Magelona spp.; LH, PV, SP, CL
Maldane sarsi Malmgren; PV, SP, LS, CL
Maldane sp.; SP
Maldanella robusta Moore; SP
Marphysa disjuncta Hartman; LH, PV, SP
Marphysa mortenseni Monro; PV
Marphysa sanguinea (Montagu); CL
Mediomastus californiensis Hartman; LH, PV, SP, NE, CL
Megalomma splendida (Moore); PV, SP, CL
Megalomma, bioculate; SP
Megalomma spp.; LH, PV, NE, CL
Melinna denticulata Moore; PV, SP, CL

Melinna spp.; LH, PV, SP
Melinnexis moorei Hartman; SP
?Mesochaetopterus sp.; CL
Myriochele gracilis Hartman; PV, SP, NE, LS, CL, CW
myriocheliid; SP
Myriowenia californiensis Hartman; PV, SP, NE, CL, CW
Myxicola infundibulum (Renier); PV, SP
Naineris nr. *quadricuspida* (Fabricius); SP
Naineris uncinata Hartman; PV, SP, NE, CL
Neanthes brandti (Malmgren); PV
Nephtys assignis Hartman; SP
Nephtys caecoides Hartman; SP, NE
Nephtys californiensis Hartman; SP, CW
Nephtys cornuta Berkeley and Berkeley; LH, SP, CL, CW
Nephtys ferruginea Hartman; PV, SP, NE, LS, CL, CW
Nephtys glabra Hartman; SP, CW
Nephtys punctata Hartman; SP
Nephtys spp.; LH, PV, SP, NE, LS, CL, CW
Nereiphylla sp.; SP
Nereis latescens Chamberlin; SP
Nereis mediator Chamberlin; CL
Nereis pelagica neonigripes Hartman; PV, CW
Nereis procera Ehlers; LH, PV, SP, NE, CL, CW
Nereis zonata Malmgren; SP
Nereis spp.; PV, CL, CW
Nerine sp.; CW
nerinid; PV
Nerinides ?acuta (Treadwell); CL
Nerinides maculata Hartman; SP, CL, CW
Nerinides pigmentata (Reish); SP, CL, CW
Nerinides sp.; CW
Nicomache sp.; SP, LS, CL
Ninoe gemmea Moore; PV, NE, SP
Ninoe sp.; CL
Nothria conchylega (Sars); CL, CW
Nothria elegans (Johnson); PV, SP, CL

Nothria geophiliformis (Moore); SP
Nothria hiatidentata Moore; CL
Nothria iridescens (Johnson); LH, PV, SP, NE, CL, CW
Nothria pallida Moore; PV, SP
Nothria stigmatis (Treadwell); SP, CL, CW
Nothria spp.; PV, SP, CL
Notocirrus sp.; PV
Notomastus latericeus Sars; CL, CW
Notomastus lineatus Claparède; PV, SP, LS, CL
Notomastus magnus Hartman; PV, SP, NE, LS, CL, CW
Notomastus tenuis Moore; LH, PV, SP, CW
Notomastus spp.; PV, SP, LS, CL
Notoproctus pacificus (Moore); CL
Odontosyllis phosphorea Moore; PV, NE, CL, CW
Odontosyllis sp.; PV, SP, CL
Oncoscolex pacificus (Moore); SP, CL
Onuphis eremita Audouin and Edwards; SP, NE
Onuphis nebulosa Moore; SP, CL
Onuphis parva Moore; PV, SP, NE, CL, CW
Onuphis vexillaria Moore; CL, CW
Ophelia limacina (Rathke); SP
Orseis sp.; CW
Owenia fusiformis collaris Hartman; PV, SP, NE, CL, CW
Panthalis pacifica Treadwell; PV, SP, NE, CL
Panthalis sp.; SP
Paradexiospira vitrea (Fabricius); SP
Paranitis polynoides (Moore); SP
Paraonis gracilis (Tauber); LH, PV, SP, NE, LS, CL, CW
Paraonis gracilis oculata Hartman; SP, CL
Paraonis sp.; abranchiate; CL
Pareulepis fimbriata (Treadwell); NE
Pareurythoe californica (Johnson); PV, SP, CL, CW
Pectinaria californiensis Hartman; LH, PV, SP, NE, CL, CW
Peisidice aspera Johnson; LH, PV, SP, LS, CL, CW
Pherusa capulata (Moore); PV, SP, NE, CL, CW
Pherusa inflata (Treadwell); PV, SP, CL

Pherusa neopapillata Hartman; LH, PV, SP, NE, CL, CW
Pherusa papillata (Johnson); CL, CW
Pherusa spp.; PV, SP, CL, CW
Pholoe glabra Hartman; LH, PV, SP, NE, CL, CW
Phragmatopoma californica (Fewkes); CL
Phyllochaetopterus limicolus Hartman; PV, SP, NE, LS, CL, CW
Phyllochaetopterus prolifica Potts; PV, SP, CL
Phyllochaetopterus sp.; CL
Phyllodoce ferruginea Moore; SP
Phyllodoce cf. *papillosa* Uschakov and Wu; SP
Phyllodoce sp.; SP
Phylo felix Kinberg; CL
Pilargis berkeleyi Monro; LH, PV, SP, NE
Pilargis hamatus Hartman; LH, PV, SP
Pilargis maculata Hartman; SP
Pisione remota (Southern); PV, CW
Pista alata Moore; PV
Pista cf. *cristata* (Müller); LH, PV, SP, NE, CL, CW
Pista disjuncta Moore; PV, SP, NE, CW
Pista elongata Moore; PV, CL
Pista moorei Berkeley and Berkeley; SP
Pista spp.; LH, PV, SP, NE, CL, CW
?*Placostegus* sp.; CL
Platynereis bicanaliculata (Baird); PV, SP, NE, CL, CW
Poecilochaetus johnsoni Hartman; PV, SP, NE, CL, CW
Polycirrus californicus Moore; CL
Polycirrus spp.; PV, SP, LS, CL, CW
Polydora nr. *armata* Langerhans; LH, CL
Polydora nr. *caulleryi* Mesnil; SP
Polydora citrona Hartman; LH
Polydora ligni Webster; LH, CL
Polydora limicola Annenkova; LH, PV
Polydora socialis (Schmarda); PV
Polydora ?*spongicola* Berkeley and Berkeley; SP
Polydora cf. *websteri* Hartman; LS
Polydora spp.; LH, PV, SP, NE, CL, CW

Polyophthalmus pictus (Dujardin); CL
Potamethus mucronatus (Moore); SP, CL
Potamethus sp.; LS
Potamilla sp.; PV, CW
Praxillella affinis pacifica Berkeley; LH, PV, SP, NE, LS, CL, CW
Praxillella gracilis (Sars); PV, SP, NE, CW
Praxillella, collared; CW
Praxillella spp.; SP, CL
Praxillura maculata Moore; CL
Prionospio cirrifera Wirén; LH, PV, SP, CL, CW
Prionospio malmgreni Claparède; PV, SP, NE, CL, CW
Prionospio pinnata Ehlers; PV, SP, NE, LS, CL, CW
Prionospio pygmaeus Hartman; SP, CL
Prionospio spp.; PV, SP, NE, LS, CL
Protis pacifica Moore; SP, CL
Protodorvillea gracilis (Hartman); PV, SP, LS, CL, CW
Protula superba Moore; CL
Psammolyce spinosa Hartman; CW
Psammolyce sp.; CL
Pseudopotamilla occelata Moore; PV, NE, CL
Pseudopotamilla, oculate; PV
Pseudopotamilla spp.; PV, SP, CL, CW
Questa caudicirra n. gen., n. sp.; LS, CW
Raricirrus maculata Hartman; PV
Rhamphobrachium longisetosum Berkeley and Berkeley; SP, CL, CW
Rhodine bitorquata Moore; SP, NE, CL, CW
Rhynchospio spp.; NE, CL, CW
Sabella crassicornis Sars; SP, CW
Sabella sp.; PV, SP, CW
Sabellaria cementarium Moore; PV, SP, CL
Saccocirrus papillocercus Bobretzky; SP
Salmacina dysteri Huxley; CL, CW
Scalibregma inflatum Rathke; PV, SP, CL, CW
Schistocomus hiltoni Chamberlin; PV, SP, NE
Sclerocheilus acirrata n. sp.; CL
Scoloplos acmeceps Chamberlin; SP, CW

Scoloplos armiger (Müller) ; SP, CL
Scoloplos (*Leodamas*) sp. ; CL
Scoloplos sp. ; SP, CL, CW
Sphaerodoridium ?biserialis (Berkeley and Berkeley) ; SP
Sphaerodoridium minutum (Webster and Benedict) ; PV, SP, CL
Sphaerodoridium sp. ; SP
Sphaerodorum papillifer Moore ; SP, CL
Sphaerodorum sp. ; PV, SP, CW
Sphaerosyllis californiensis n. sp. ; PV
Sphaerosyllis sp. ; PV, SP, LS, CL, CW
Spio punctata Hartman ; PV, SP, NE, LS, CL, CW
Spiophanes anoculata Hartman ; SP
Spiophanes bombyx (Claparède) ; PV, SP, CW
Spiophanes fimbriata Moore ; PV, SP, CL, CW
Spiophanes missionensis Hartman ; PV, SP, NE, CL
Spiophanes spp. ; PV, SP, CL, CW
Spirobranchus spinosus Moore ; CL
spirorbids ; PV, CL, CW
Sternaspis fossor Stimpson ; PV, SP, NE, CL, CW
Sthenelais fusca Johnson ; CL
Sthenelais tertiaglabra Moore ; PV, SP, NE, CL, CW
Sthenelais verruculosa Johnson ; CL, CW
Sthenelais sp. ; SP, CL
Sthenelanella uniformis Moore ; PV, SP, NE, CL, CW
Streblosoma crassibranchia Treadwell ; PV, SP, CL, CW
Streblosoma sp. ; SP, CL
Syllis gracilis Grube ; PV
Syllis sp. ; SP, CL
Telepsavus costarum Claparède ; LH, PV, SP, NE, CL, CW
Terebellides stroemii Sars ; PV, SP, NE, LS, CL, CW
Thalenessa spinosa (Hartman) ; PV, SP, NE, LS, CL, CW
Tharyx marioni (Saint-Joseph) ; PV, CW
Tharyx monilaris Hartman ; PV, SP, CL
Tharyx multifilis Moore ; PV, SP, NE, CW
Tharyx tesselata Hartman ; LH, PV, SP, LS, CL, CW
Tharyx spp. ; PV, SP, NE, LS, CL, CW

Thelepus setosus (Quatrefages); SP, CL
Thelepus sp.; CL
Thormora johnstoni (Kinberg); PV
Timarete sp.; CL
Travisia brevis Moore; SP, NE
Travisia gigas Hartman; PV, SP, CW
Travisia pupa Moore; PV, SP, NE, CL
Travisia spp.; LH, CL, CW
Trypanosyllis gemmipara Johnson; PV
Trypanosyllis sp.; CL
Typosyllis aciculata Treadwell; CL
Typosyllis spp.; PV, SP, LS, CL
Vermiliopsis biformis Hartman; SP, CL, CW
Vermiliopsis cornuta Rioja; CL
Vermiliopsis infundibulum Philippi; CL
Vermiliopsis sp.; SP, CL, CW

ECHINODERMS

(E=echinoid, O=ophiuroid, H=holothuroid, A=asteroid, C=crinoid)

E *Allocentrotus fragilis* (Jackson); SP, LS, CL
O *Amphiacantha amphacantha* (McClendon); PV, SP, NE, LS, CL, CW
O *Amphiodia* (*Amphispina*) *digitata* Nielsen; LH, PV, SP, NE, CL, CW
O *Amphiodia* (*Amphispina*) *urtica* (Lyman); PV, SP, NE, LS, CL, CW
O *Amphiodia occidentalis* Lyman; LH, SP, CL
O *Amphiodia psara* H. L. Clark; SP, NE
O *Amphiodia*, rugose; SP
O *Amphioplus hexacanthus* H. L. Clark; SP, CL, CW
O *Amphioplus strongyloplax* (H. L. Clark); PV, SP, NE, LS, CL, CW
O *Amphipholis pugetana* (Lyman); PV, SP, LS, CL, CW
O *Amphipholis squamata* (delle Chiaje); PV, SP, NE, LS, CL, CW
O *Amphiura arcystata* H. L. Clark; PV, SP, NE, CL, CW
O *Amphiura seminuda* Lütken and Mortensen; SP, LS
A *Asterina miniata* (Brandt); PV, CW

A *Astropecten californicus* Fisher; PV, SP, NE, CL, CW
A *Astropecten* sp.; NE, CL
O *Astrophiura marionae* Ziesenhenne; LS
E *Benthopecten acanthonotus* Fisher; SP
E *Brisaster townsendi* (A. Agassiz); PV, SP, CL
E *Brissopsis pacifica* (A. Agassiz); PV, SP, LS, CL, CW
H *?Caudina* sp.; CL
E *Centrostephanus coronatus* (Verrill); CL
A *Cryptopeltaster lepidonotus* Fisher; SP
H *Cucumaria* sp.; SP, CL
E *Dendraster excentricus* (Eschscholtz); LH, PV, SP, NE
E *Dendraster laevis* H. L. Clark; SP
E *Dendraster* sp.; SP
C *Florometra perplexa* (H. L. Clark); SP, CL
E *Gonimaretia laevis* H. L. Clark; SP
A *Gorgonocephalus caryi* (Lyman); SP
A *Henricia* sp.; SP, CL, CW
H *Leptosynapta albicans* (Selenka); PV, SP, NE, LS, CL, CW
H *Leptosynapta* sp.; SP, CW
A *Leptychaster* (*Parastropecten*) *pacificus* Fisher; SP
E *Lovenia cordiformis* A. Agassiz; SP, CL, CW
A *Luidia asthenosoma* Fisher; CL
A *Luidia foliolata* Grube; SP, CL, CW
A *Luidia ludwigi* Fisher; PV, CL
A *Luidiaster californicus* Ziesenhenne; SP, LS
E *Lytechinus anamesus* H. L. Clark; PV, SP, NE, CL, CW
A *Mediaster aequalis* (Stimpson); CL
H *Molpadia intermedia* (Ludwig); PV, SP, NE, CL, CW
H *Molpadia* sp.; CL
A *Myxoderma platyacantha* H. L. Clark; SP
A *Odontaster crassus* Fisher; SP
O *?Ophiacantha bairdi* Lyman; LS
O *Ophiacantha diplasia* H. L. Clark; SP, LS, CL, CW
O *Ophiacantha paucispina* Lütken and Mortensen; SP
O *Ophiacantha phragma* Ziesenhenne; SP
O *Ophiacantha rhachophora* H. L. Clark; SP

O *Ophiacantha* sp.; SP
O *Ophiocynodus corynetes* H. L. Clark; SP, LS, CL, CW
O *Ophioderma* sp.; SP
O *Ophiomusium jolliensis* McClendon; SP, CW
O *Ophionereis eurybrachyplax* H. L. Clark; CL
O *Ophiopholis bakeri* McClendon; SP, LS, CL
O *Ophiopholis longispina* H. L. Clark; CW
O *Ophiopsila californica* A. H. Clark; CL, CW
O *Ophiopteris papillosa* (Lyman); CL, CW
O *Ophiothrix spiculata* Le Conte; PV, SP, NE, LS, CL, CW
O *Ophiura kofoidi* McClendon; SP
O *Ophiura leptoctenia* H. L. Clark; SP, CL
O *Ophiura lutkeni* (Lyman); PV, SP, NE, CL, CW
O *Ophiuroconis bispinosa* Ziesenhenne; PV, SP
H *Pachythyone rubra* (H. L. Clark); LH, SP, CL
H *Parastichopus californicus* (Stimpson); CL
H *Pentamera pseudopopulifera* Deichmann; LH, PV, SP, NE, CL, CW
A *Pisaster capitatus* (Stimpson); PV
H *Psolus* sp.; SP
A *Rathbunaster californicus* Fisher; SP
A *Sclerasterias heteropaes* Fisher; PV, SP, CL
E *Spatangus californicus* H. L. Clark; LS, CL
H *Stichopus* sp.; CL
E *Strongylocentrotus franciscanus* (A. Agassiz); SP
E *Strongylocentrotus purpuratus* (Stimpson); PV, SP
E *Strongylocentrotus* sp.; SP
A *Stylasterias forreri* (de Loriol); SP

MOLLUSKS

(P=pelecypod, G=gastropod, S=scaphopod, SO=solenogaster, A=amphineuran, C=cephalopod, V=vermetid. Including those named in the brachiopod association from Mattox, 1955:8.)

P *Acila castrensis* (Hinds); SP, CL, CW
G *Acteocina culcitella* (Gould); SP
G *Acteocina culcitella intermedia* Willett; SP, NE, CL
G *Acteon punctocoelata* (Carpenter); LH, PV, SP, CL

G *Admete californica* Dall; SP
G *Admete* sp.; SP
P *Adontorhina cyclia* Berry; LH, PV, SP, NE, CL
P *Aequipecten circularis aequiculcatus* (Carpenter); SP
G *Aglaja purpurea* Bergh; PV
G *Aglaja* sp.; LH, PV, SP, CL, CW
P *Aligena* sp.; SP, CL
G *Amphissa bicolor* Dall; SP, CL
G *Amphissa* cf. *reticulata* Dall; PV
G *Amphissa undata* Carpenter; PV, SP
G *Amphissa* sp.; PV
P *Amygdalum pallidulum* (Dall); PV, SP, CL, CW
G *Anisodoris nobilis* (MacFarland); CL
G *Antiplanes ?perversa* (Gabb); SP, CL
G *Antiplanes* sp.; CW
G *Armina californica* (Bergh); CL
P *Asthenothaerus villosior* Carpenter; LH, PV
P *Axinopsida serricata* (Carpenter); PV, SP, NE, CL
G *Balcis catalinensis* (Bartsch); CL
G *Balcis ?compacta* (Carpenter); SP
G *Balcis rutila* (Carpenter); LH, SP, CL
G *Balcis* sp.; PV, SP, NE
G *Bittium catalinensis* Bartsch; SP, CL
G *Bittium ?larum* Bartsch; SP
G *Bittium subplanatum* Bartsch; SP
G *Boreotrophon triangulatus* (Carpenter); CL
G *Borsonella dalli* Arnold; SP
P *Botulina denticulata* (Dall); CL
P *Burchia redondoensis* (Burch); PV
G *Bursa californica* (Hinds); SP, CL
S *Cadulus fusiformis* Pilsbry and Sharp; LH, CL
S *Cadulus tolmiei* Dall; SP, LS, CL
S *Cadulus* spp.; LH, PV, SP, NE, CL, CW
G *Calliostoma tricolor* Gabb; PV, CL
G *Calliostoma* sp.; PV, CW
G *Cancellaria cooperi* (Gabb); CL

G *Cancellaria crawfordiana* Dall; CL
G *Cancellaria* sp.; PV
G *Capulus californicus* Dall; SP
P *Cardiomya pectinata* (Carpenter); SP, CL
P *Cardiomya* sp.; PV
G *Carolina tridentata* Forskal; CL
P *Cardita ventricosa* Gould; PV, SP, NE, CL, CW
P *Cardita* spp.; SP, LS, CL
P *Chione undatella* Sowerby; LH
P ?*Chione* sp.; PV
P *Chlamys hastatus* Sowerby; CL
P *Chlamys hericius* (Gould); CL
P *Chlamys latiauratus* Conrad; SP
P *Chlamys* sp.; LH, PV, SP, CL
P *Clinocardium nuttalli* (Conrad); CL
P *Compsomyax subdiaphana* (Carpenter); LH, PV, SP, NE, CL, CW
G *Conus californicus* Hinds; PV, SP, CL, CW
P *Crenella columbiana* Dall; NE
P *Crenella decussata* Montagu; SP, CL
P *Crenella divaricata* d'Orbigny; SP
P *Crenella* sp.; SP
G *Crepidula aculeata* (Gmelin); LH
G *Crepidula excavata* Broderip; NE
G *Crepidula nivea* Adams; PV, CL
G *Crepidula norissiarum* Williamson; SP
G *Crepidula onyx* Sowerby; PV
G *Crepidula* spp.; LH, PV, SP, CW
G *Crepipatella lingulata* (Gould); PV
SO *Crystallophrisson hancocki* Schwabl; SP
SO *Crystallophrisson hartmani* Schwabl; SP
SO *Crystallophrisson marinellii* Schwabl; SP
SO *Crystallophrisson rectum* Schwabl; SP
SO *Crystallophrisson* spp.; PV, SP
P *Cuspidaria apodema* Dall; SP, CL
P *Cuspidaria* sp.; NE, CL, CW

P *Cyathodonta pedroana* Dall; PV
P *Cyclopecten vancouverensis* (Whiteaves); PV, CL
G *Cylichnella attonsa* (Carpenter); LH, PV, SP, NE
G *Cylichnella diegensis* (Dall); LH, PV, SP, NE, CL
P *Cyrilla minuta* Dall; SP, CL
P *Dacrydium pacificum* Dall; SP, CL
P *Dacrydium* sp.; LS
V *Dendropoma lituella* (Mörch); CL
S *Dentalium neohexagonum* Pilsbury and Sharp; SP
S *Dentalium rectius* Carpenter; PV, SP, CL
S *Dentalium* sp.; LH, CL
P *Dermatomya tenuiconcha* (Dall); CL
G *Diadora aspera* Eschscholtz; PV
P *Donax gouldi* Dall; SP
G *Elaeocyma empyrosia* (Dall); SP, CL
G *Elaeocyma halocydne* (Dall); CL
P *Ensis myrae* Berry; SP
G *Epitonium bellastriatum* Carpenter; SP
G *Epitonium tinctum* (Carpenter); NE, CL
G *Epitonium* spp.; PV, SP, NE, CL, CW
P *Erycina chacei* Dall; SP
G *Eulima californica* Bartsch; SP, CL
G *Eulima rutila* (Carpenter); SP
G *Eulima* sp.; CL
G ?*Fusinus* sp.; PV
P *Gari edentula* (Gabb); SP
G *Gastropteron* sp.; CL
G *Glans carpenteri* (Lamy); PV
P *Glycimeris subobsoleta* Carpenter; LS, CL
G *Haminoea virescens* (Sowerby); CL
G *Hemitoma bella* (Gabb); CL
P *Hinnites* sp.; CW
G *Hyalima* sp.; CW
G *Kellettia kelleti* Forbes; CL
P *Kellia laperousii* Deshayes; PV
P *Kellia suborbicularis* (Montagu); CL

P *Kellia* sp.; LH, PV, SP, CW
G ?*Lacuna* sp.; NE
P *Leda* sp.; PV
A *Lepidopleurus nexus* Carpenter; LS
A *Lepidozona catalinae* Willett; CL
P *Lima dehiscens* Conrad; PV, SP, CL, CW
P *Lima subauriculata* Montagu; PV, CL, CW
SO *Limifossor fratula* Health; SP
SO *Limifossor* sp.; LS
P *Limopsis diegensis* Dall; CL
P *Linga lichthofeni* (Gabb); SP
P *Linga* sp.; SP
P *Lithophaga plumula kelseyi* Hertlein and Strong; PV
P *Lithophaga* sp.; CL
P *Lucinisca nuttalli* (Conrad); LH, PV, SP
P *Lucinoma annulata* Reeve; LH, PV, SP, CW
P *Lyonsia californica* Conrad; LH, PV, NE, CL
P *Lyonsia* sp.; SP
P *Macoma indentata* Carpenter; LH
P *Macoma nasuta* Conrad; LH, SP
P *Macoma yoldiformis* Carpenter; LH, PV, SP, NE
P *Macoma* sp.; LH, PV, SP, NE
P *Mactra ?californica* Conrad; LH
G *Mangelia arteaga* Dall and Bartsch; SP
G *Mangelia barbarensis* Oldroyd; LH, SP
G *Mangelia* spp.; LH, PV, SP, NE
G ?*Margarites* sp.; SP
G *Megasurcula carpenteriana* (Gabb); NE, CL
G *Melanella* sp.; CL
G *Micranellum crebricinctum* (Carpenter); CL
G *Micranellum* sp.; SP
G *Mitrella* sp.; SP
P *Modiolus capax* (Conrad); CL
P *Modiolus modiolus* Linnaeus; PV, SP
P *Modiolus neglectus* Soot-Ryen; LH, SP
P *Modiolus sacculifer* (Berry); PV, CL

P *Mytilus* sp.; PV
G *Nassarius cooperi* (Forbes); LH
G *Nassarius insculptus* (Carpenter); CL
G *Nassarius mendicus* (Gould); PV
G *Nassarius perpinguis* (Hinds); LH, PV, SP, NE
G *Nassarius* sp.; PV, CL, CW
G ?*Natica clausa* Broderip and Sowerby; SP
P *Nemocardium centrifilosum* (Carpenter); SP, CL
P *Nemocardium* sp.; CL, CW
G *Neosimnia acicularis* (Lamarck); PV
G *Neosimnia loebbeckeana* (Weinkauff); CL
G *Neosimnia* sp.; CL
G *Nitidella carinata* (Hinds); PV, NE
G *Nitidella ?gouldi* Carpenter; SP
G *Nitidella permodesta* (Dall); SP, LS, CL
G *Nitidella ?tuberosa* (Carpenter); PV
G ?*Nitidella* sp.; PV
P *Nucula carlottensis* Dall; PV, SP, CL
P *Nucula linki* Dall; CL
P *Nucula tenuis* Montagu; SP, NE
P *Nucula* sp.; SP, CL
P *Nuculana conceptionis* (Dall); SP, LS
P *Nuculana hamata* (Carpenter); PV, SP, LS, CL
P *Nuculana minuta* (Fabricius); SP
P *Nuculana taphria* (Dall); LH, SP, NE, CL, CW
C *Octopus apollyon* Berry; CL
G *Odostomia herilda* Dall and Bartsch; SP
G *Odostomia* sp.; LH, PV, SP
G *Olivella baetica* Carpenter; LH, PV, SP, NE
G *Olivella ?pedroana* (Conrad); NE
G *Ophiodermella incisa* Carpenter; LH, PV, SP
P *Pandora bilirata* Conrad; PV, SP, NE, CL
P *Pandora* sp.; NE
P *Parvilucina tenuisculpta* (Carpenter); LH, PV, SP, LS, CL
P *Pecten* (*Pecten*) *diegensis* Dall; CL
P *Pecten* spp.; PV, SP, CW

G *Pedicularia californica* Newcomb; CW
P *Periploma discus* Stearns; LH, SP
P *Periploma planiuscula* Sowerby; PV, SP
P *Periploma* sp.; SP
G *Philine* sp.; CL
P ?*Plagioctenium circularis* (Sowerby); PV, SP
G *Pleurobranchaea* sp.; CL
P *Pododesmus macroschismus* Deshayes; PV
G *Polinices* cf. *draconis* Dall; PV
G *Polinices lewisii* Gould; SP, NE
G *Polinices* sp.; PV, SP
P *Poromya* sp.; LH, SP
SO *Prochaetoderma californica* Schwabl; SP, CL
P *Protothaca staminea* (Conrad); PV
P *Protothaca tenerrima* Carpenter; LH
P *Psephidia lordi* Baird; SP
P *Psephidia* sp.; SP
P *Pseudamusium* ?*incongruus* (Dall); SP
P *Pseudochama exogyra* (Conrad); CL
P *Pseudopythina chacei* (Dall); SP, NE
P *Pseudopythina* sp.; PV
G *Pterynotus carpenteri* Dall; CL
G *Pterynotus petri* (Dall); CL
G *Pterynotus* sp.; CL
G *Puncturella cucullata* (Gould); CL
G *Puncturella galeata* (Gould); CL
G *Pusula californica* (Gray); CL
G *Retusa harpa* Dall; SP
P *Rochefortia aleutica* Dall; PV, SP, NE
P *Rochefortia* cf. *golischi* Dall; SP
P *Rochefortia tumida* Carpenter; NE
P *Rochefortia* spp.; LH, PV, SP, NE
P *Saxicava arctica* (Linnaeus); PV, SP, LS, CL, CW
P *Saxicava* cf. *rugosa* (Linnaeus); CL
P *Saxicavella pacifica* Dall; PV, SP, NE, LS
P *Semele pulchra* (Sowerby); CL

P *Siliqua lucida* Conrad ; SP, CW
G *Sinum debile* Gould ; PV
G *Sinum scopulosum* Conrad ; PV, CL
P *Solamen columbianum* (Dall) ; LH, PV, SP, LS, CL
G *Solariella peramabilis* Carpenter ; CL
G *Solariella* sp. ; SP
P *Solemya panamensis* Dall ; SP
P *Solemya* sp. ; PV
P *Solen rosaceus* Carpenter ; LH, SP, CL
P *Solen sicarius* Gould ; LH, SP, NE
P *Solen* spp. ; PV, SP, CW
P *Sphenia fragilis* Carpenter ; CL
P ?*Sphenia* sp. ; PV
P *Spisula planulata* Conrad ; SP
P *Spisula* sp. ; SP
P *Sportella californica* Dall ; CL
G *Strombiformis californicus* Bartsch ; SP
G *Sulcuretusa taphria* (Dall) ; SP
P *Tagelus californicus* Conrad ; LH, SP
P ?*Tapes* sp. ; PV
P *Tellina buttoni* Dall ; LH, SP, CL
P *Tellina carpenteri* Dall ; LH, PV, SP, LS, CL, CW
P *Tellina idae* Dall ; LH, SP, CW
P *Tellina modesta* Carpenter ; PV, NE, CL
P *Tellina* spp. ; PV, SP, CL
P *Thracia curta* Conrad ; PV
P *Thracia trapezoides* Conrad ; SP
P *Thracia* sp. ; PV
P *Thyasira barbarensis* Dall ; LH, CL
P *Thyasira ?gouldii* (Philippi) ; SP
P *Thyasira trisinuata* Orbigny ; SP, PV, CL
P *Thyasira* spp. ; LH, PV, SP, NE, CL, CW
P *Trachycardium quadragenarium* (Conrad) ; PV, SP, CL
G *Triophora* sp. ; CL
G *Tritoniopsis aurantia* Mattox ; CL
G *Turbonilla antimunda* Dall and Bartsch ; SP

G *Turbonilla* cf. *attrita* Dall and Bartsch; SP
G *Turbonilla santarosana* Dall and Bartsch; SP
G *Turbonilla* spp.; LH, PV, SP, NE, CL
G *Turritella cooperi* Carpenter; CL
V vermetid; PV, SP, CW
P *Verticordia ornata* (d'Orbigny); CL
G *Vitrinella* sp.; LH, PV
G *Volvulella cylindrica* (Carpenter); SP
G *Volvulella tenuissima* Willett; LH, PV, SP, NE, CL
G *Volvulella* sp.; PV, SP
G *Zonaria* sp.; PV

SYSTEMATIC LIST OF BRYOZOA IDENTIFIED FROM FARNSWORTH BANK, SANTA CATALINA ISLAND, IN SAMPLES OF VELERO IV, STATIONS NUMBERED 3594, 3595 AND 10334

by William Banta

The following bryozoan species have been identified in three samples taken by the VELERO IV, from Farnsworth Bank, near Santa Catalina Island. Specific accounts of all species may be consulted in the monograph by Osburn (1950-1953, Hancock Pac. Exped., vol. 14). The relative abundance of species is indicated by symbols, as follows: P = present; U = uncommon; O = occasional; C = common, and A = abundant; — = not recovered.

Name of Species	Station Numbers of Velero IV		
Family HINKSINIDAE	3594	3595	10334
Antropora tincta (Hastings 1930)	—	P	C
Hinksina velata (Hinks 1881)	P	—	P
Cauloramphus spiniferum (Johnston 1832)	O	—	P
Cauloramphus brunnea (Canu and Bassler 1930)	—	—	C
Family ALDERINIDAE			
Alderina smitti Osburn 1950	—	—	P
Mollia patellaria (Moll 1803)	—	—	C
Callopora circumclathrata (Hinks 1881)	P	P	—
Callopora corniculifera (Hinks 1884)	—	—	P
Callopora ?inconspicua (O'donoghue 1923)	—	—	P
Copidozoum tenuirostre (Hinks 1880)	P	—	U

Name of Species	Station Numbers of Velero IV		
	3594	3595	10334
Family CHAPERIELLIDAE (= CHAPPERIIDAE)			
Chaperiella (= *Chapperia*) *californica* (Osburn 1950)	—	P	C
Chaperiella (= *Chapperia*) *patula* (Hinks 1881)	—	—	P
Family MICROPORIDAE			
Micropora coriacea (Esper 1791)	P	C	C
Family CELLARIIDAE			
Cellaria mandibulata Hinks 1882	P	—	C
?*Cellaria diffusa*? Robertson 1905	—	—	P
Family SCRUPOCELLARIIDAE			
Amastigia rudis (Busk 1852)	—	—	P
Caberia boryi (Audouin 1826)	P	—	—
Scrupocellaria varians (Hinks 1882)	P	—	—
Family BICELLARIELLIDAE			
Dendrobeania longispinosa (Robertson 1905)	—	—	P
Family CRIBRILINIDAE			
Reginella mucronata (Canu and Bassler 1923)	—	C	—
Lyrula hippocrepis (Hinks 1882)	P	P	—
Colletosia radiata (Moll 1803)	P	P	P
Colletosia sp.	—	P	—
Figularia hilli Osburn 1950	—	P	—
Division ASCOPHORA			
Family HIPPOTHOIDAE			
Hippothoa distans (MacGillivary 1896)	—	P	—
Celleporella (= *Hippothoa*) *hyalina* (Linnaeus 1758)	P	P	—
Trypostega claviculata (Hinks 1884)	—	P	O
Family SCHIZOPORELLIDAE			
?*Schizoporella linearis* var. *inarmata* Hinks 1884	—	—	O
Emballotheca obscura Osburn 1952	—	—	P
Schizomavella auriculata (Hassall 1842)	P	—	—
Hippodiplosia insculpta (Hinks 1882)	P	—	—
Family HIPPOPORINIDAE			
Hippoporina porcellina (Busk 1860)	P	P	C
Hippoporella nr. *gorgonensis* Hastings 1930	—	—	P

Name of Species	Station Numbers of Velero IV		
	3594	3595	10334
Stephanosula vitrea Osburn 1952	—	—	P
Hippomonavella longirostrata (Hinks 1883)	—	—	P
hippoporinid, unidentified	—	—	P
Family MICROPORELLIDAE			
Microporella ciliata (Pallas 1776)	—	P	—
Microporella vibraculifera (Hinks 1884)	—	P	P
Microporella cribosa Osburn 1952	P	—	—
Microporella californica (Busk 1856)	P	—	—
Fenestrulina malusi (Audouin 1826)	P	P	O
Family SMITTINIDAE			
Porella porifera (Hinks 1884)	O	C	C
Porella patens Osburn 1952	—	—	P
Rhamphostomella curuirostrata (O'donoghue 1923)	—	—	O
Smittina landsborovi (Johnston 1847)	—	P	—
Parasmittina trispinosa (Johnston 1838)	—	—	U
Escharella (= *Mucronella*) *major* (Hinks 1884)	P	P	C
Family RETEPORIDAE			
Phidolopora labiata Gabb and Horn 1862 [= *P. pacifica* (Robertson 1908)]	A	—	—
Rhynchozoon rostratum (Busk 1856) [incl. *R. tumulosum*]	P	P	P
Rhynchozoon grandicella Canu and Bassler 1923	—	—	P
Family CREPIDACANTHIDAE			
Crepidacantha poissoni (Audouin 1826)	—	—	P
Family PHYLACTELLIDAE			
Lagenopora socialis (Hinks 1877)	P	—	—
Lagenopora spinulosa (Hinks 1883)	P	—	O
Lagenopora punctulata (Gabb and Horn 1862)	—	—	P
Family CELLEPORARIIDAE (= CELLEPORIDAE)			
Celleporaria (= *Holoporella*) *brunnea* (Hinks 1884)	P	—	C
Celleporina (= *Costazia*) *robertsonae* (Canu & Bassler 1923)	C	P	O
Celleporina (= *Costazia*) *procumbens* (Osburn 1952)	—	—	P

Name of Species	Station Numbers of Velero IV		
	3594	3595	10334
Family ONCOUSOECIIDAE			
Proboscina ?sigmata Osburn 1953	—	—	P
Proboscina, two other species	—	—	P
Family DIASTOPORIDAE			
Diaperoecia californica (d' Orbigny 1852)	C	—	—
Family TUBULIPORIDAE			
Tubulipora tuba (Gabb and Horn 1862)	P	P	U
Tubulipora pacifica Robertson 1910	P	—	—
Platonea ?expansa Osburn 1953	—	—	P
Family CRISIIDAE			
Crisidia corunata (Linnaeus 1758)	—	—	O
Crisia occidentalis Trask 1857	—	—	P
Family PENETRANTIIDAE			
?Penetrantia concharum Silen 1946	—	P	P

Serial numbers 11 to 267 with Velero Station numbers from each station for which analyses are given
(See also vol. 19(1):6 and 12-38, for map and additional data).

Serial number	area code	Velero Station no.
11	PV	4854
12	PV	4855
14	PV	2788
19	PV	4832
27	PV	2473; 4802; 4803; 4833
28	PV	2472; 3050; 4801; 4805; 4806; 4807; 4830; 4856; 5096; 5101; 5102; 5541
29	LH	2307; 2508; 6107
30	LH	2507; 5808
32	LH	2314
33	LH	4718
41	PV	4831; 5029
42	PV	2417; 2962; 3049; 3051; 5027; 5502
43	PV	5028; 5030

Serial number	area code	Velero Station no.
44	PV	2470
45	SP	3047; 3048; 5753
46	SP	2107; 6100
47	SP	2006; 3053; 6102
48	SP	4719; 4886
49	SP	4885
50	SP	2741
60	PV	2430
62	SP	5754
63	SP	3052; 5751
64	SP	5752; 5844
65	SP	6104
66	SP	2311
67	SP	2504; 5741
68	SP	5740
83	SP	5743
86	SP	5742
89	CL	2798
98	SP	2306
99	SP	2355; 5749
100	SP	5750
101	SP	5748; 5820
103	SP	5745
104	SP	2292
105	SP	2630
108	SP	5003; 5087
110	NE	2745
123	SP	2126; 5747
129	SP	5086; 5746
134	NE	2747; 4877
135	CL	2737
136	CL	2738
145	SP	2836
154	SP	2884
160	CL	2736; 5146
161	CL	2389
162	CL	3569; 3570; 5148
174	SP	2416; 2987
184	SP	4778
185	NE	4777; 4871; 4878; 5092; 5354

Serial number	area code	Velero Station no.
186	CL	2142; 2955; 2957; 2959; 2960; 2961; 3310
187	CL	2302; 2733
189	CL	2301
194	SP	2802
197	SP	2898
199	SP	2372
200	SP	2895
201	SP	2886
207	CL	2452
208	CL	2451; 2952; 2953
210	CL	2365
211	SP	2393; 2837
213	SP	2229
217	SP	2901
219	SP	2894
220	LS	2843
221	LS	2887
222	SP	2644
224	CL	1370; 1371; 2128; 2144; 2152; 2450
225	CL	5727
226	CL	2426
227	SP	2352; 2859
228	6M	2154; 2204; 2228
229	6M	2845
231	SP	2900
232	SP	2370
233	SP	2844
234	LS	2299
235	LS	2298
236	LS	2297
238	CL	2121; 2637; 2638; 2853; 2855; 3603; 3605
239	CL	2639; 3601
240	CL	2367
241	SP	2350; 2640
242	SP	2368
243	SP	2369
244	SP	2440
249	SP	2635

Serial number	area code	Velero Station no.
250	CL	2436; 3045; 7707; 7719; 7723; 7725
251	CL	2347; 7709; 7726
252	CL	2344
253	CL	7720
259	CL	2122; 3611; 3613; 3615; 4045; 5095
260	CL	2348; 3616; 3617; 7712
262	SP	2342
263	SP	2341
267	SP	2177; 2438; 7713

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PLATES

PLATE 1

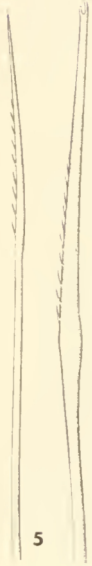
Gattyana brunnea, new species (Sta. 2154).

1. Elytrum from seventh segment, in dorsal view, x 30.
2. Distal end of a notoseta from eleventh parapodium, in lateral view, x 310.
3. Distal end of a neuroseta from eleventh parapodium, in lateral view, x 310.

Harmothoe priops Hartman (Sta. 5402).

4. Prostomium and first few segments, in dorsal view, x 94.
5. Distal end of notoseta from a median parapodium, x 140.
6. Distal end of neuroseta from a median parapodium, x 140.

4



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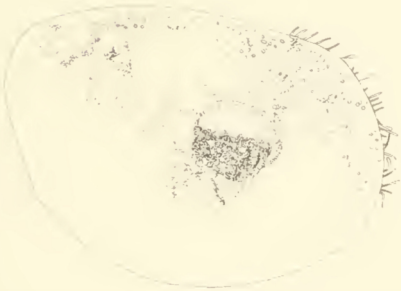

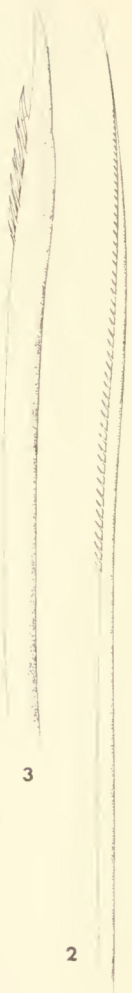

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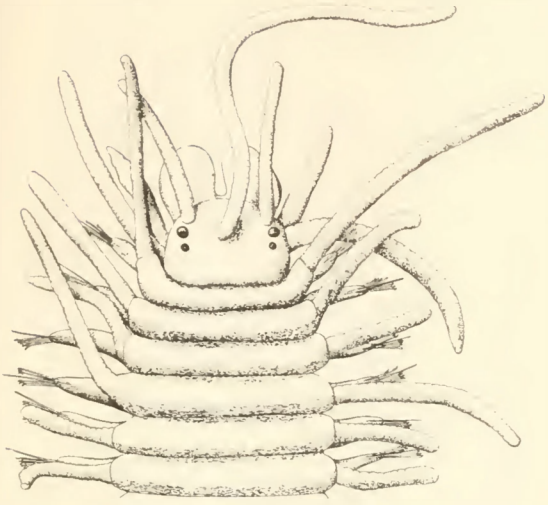
PLATE 2

Eusyllis transecta, new species (Sta. 2006)

1. Anterior end in dorsal view, x 92.
2. Pharyngeal tooth, in lateral view, x 245.
3. Distal end of pharynx, x 490.
4. A median parapodium in anterior view, x 145.
5. Superiormost seta from an anterior parapodium, x 1042.
6. Short falcigerous seta, from anterior segment, in lateral view, x 1042.
7. Short falcigerous seta, from posterior segment, in lateral view, x 1042.
8. Aciculum with bulbous tip, x 1042.



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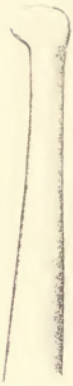

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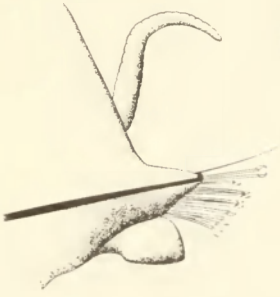

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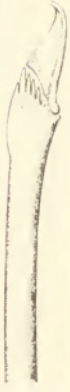

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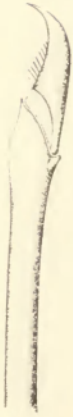

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PLATE 3

Sphaerosyllis californiensis, new species (Sta. 5028)

1. Anterior end, in dorsal view, x 125.
2. Posterior end, in dorsal view, x 125.
3. A median parapodium, in anterior view, x 270.
4. Falcigerous seta with dentate cutting edge, x 1450.
5. Falcigerous seta with smooth cutting edge, x 1450.
6. Distal end of an inferior simple seta, x 1450.
7. Distal end of an aciculum, x 1450.

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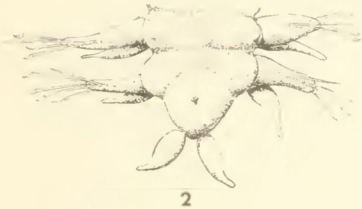

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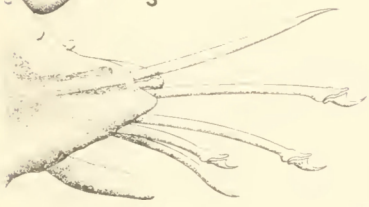

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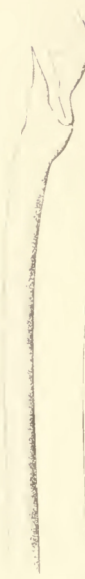

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PLATE 4

Questa caudicirra, new genus and species (Sta. 3595)

1. Entire body, in dorsal view, x 16.
2. Posterior end in three-fourths dorsal view, x 30.
3. Anterior end, through five setigerous segments, in dorsal view, x 32.
4. A median parapodium, in posterior view, x 120.
5. Seta from a median parapodium, x 310.
6. Bidentate hook from a median parapodium, x 310.

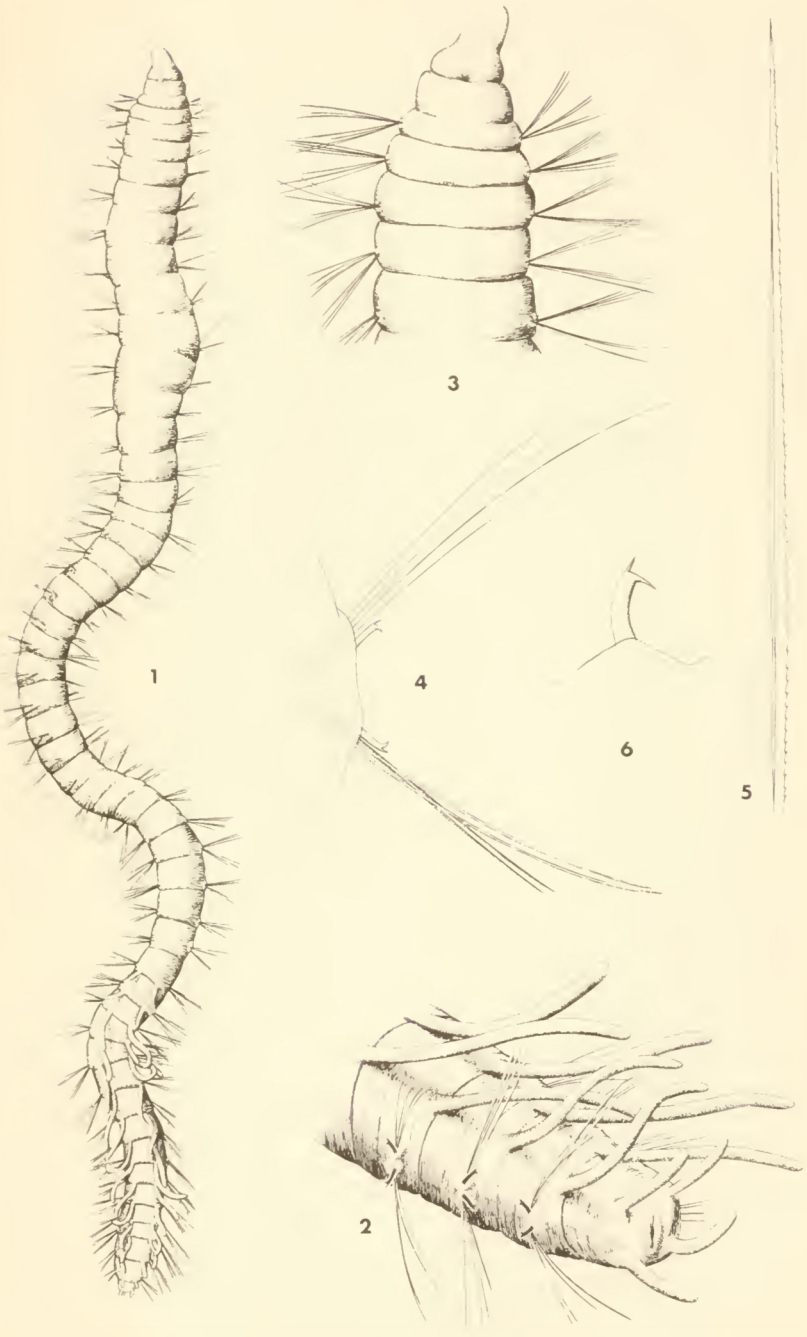
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PLATE 5

Sclerocheilus acuratus, new species (Sta. 1370)

1. Anterior end, in dorsal view, x 74.
2. Acicular hook from first parapodium, x 490.
3. Slenderer seta from first parapodium, x 490.
4. Furcate seta from a median parapodium, x 490.
5. Tip of furcate seta, showing teeth along tines, x 980.

Isclerocheilus californicus Hartman (Sta. 3037)

6. Prostomium and first few segments, in dorsal view, x 29.
7. A posterior parapodium, showing prolonged lobes, x 29.
8. Acicular hook from first segment, in lateral view, x 260.
9. Tip of furcate seta, showing teeth along tines, x 980.

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PLATE 6

Euchone arenae, new species (Sta. 2788)

1. Ventral end of radiolar base, showing one of two simple radioles, x 48.
2. Thoracic superior seta, in lateral view, x 588.
3. Thoracic inferior seta, in lateral view, x 588.
4. Thoracic uncinus, in lateral view, x 588.
5. Abdominal uncinus, in lateral view, x 1440.
6. Posterior anal groove, in ventral view, x 40.

Euchone limicola Reish (Alamitos Bay)

7. Thoracic seta, in lateral view, x 336.
8. Abdominal uncinus, in frontal view, x 336.
9. Abdominal uncinus, in three-fourths view, x 780.
10. Posterior anal groove, in ventral view, x 46.


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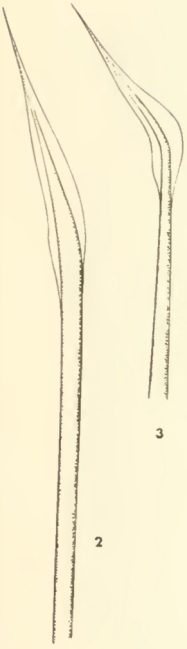
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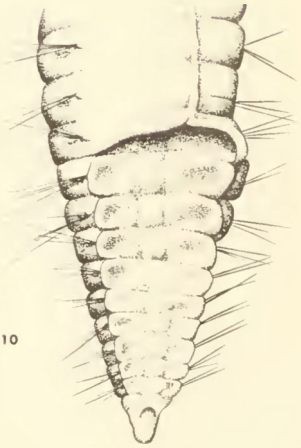
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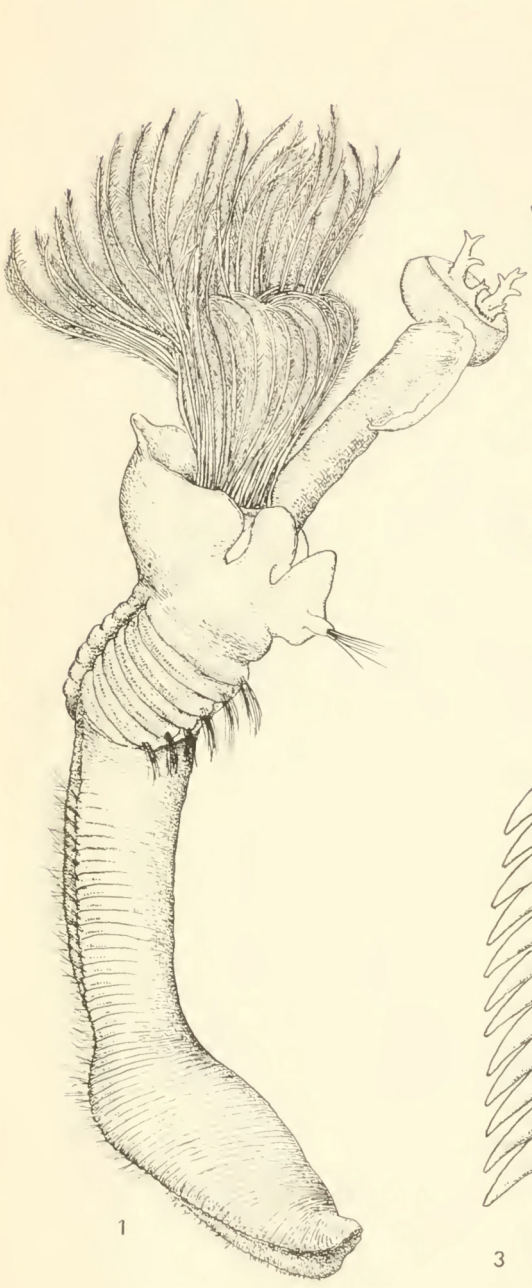
PLATE 7

Spirobranchus spinosus Moore (Isthmus Cove)

1. Entire animal, in left lateral view, x 6.3.
2. Operculum, in dorsal view, x 12.6.
3. Thoracic uncinus, in lateral view, x 875.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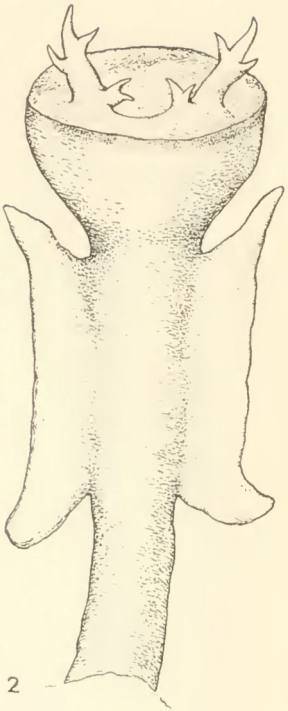
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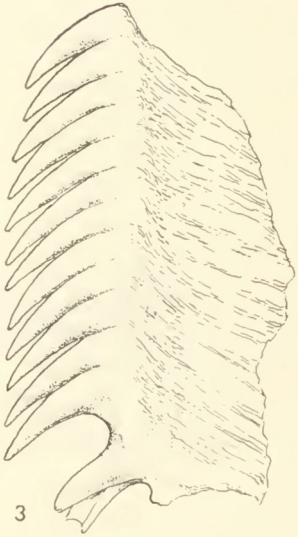
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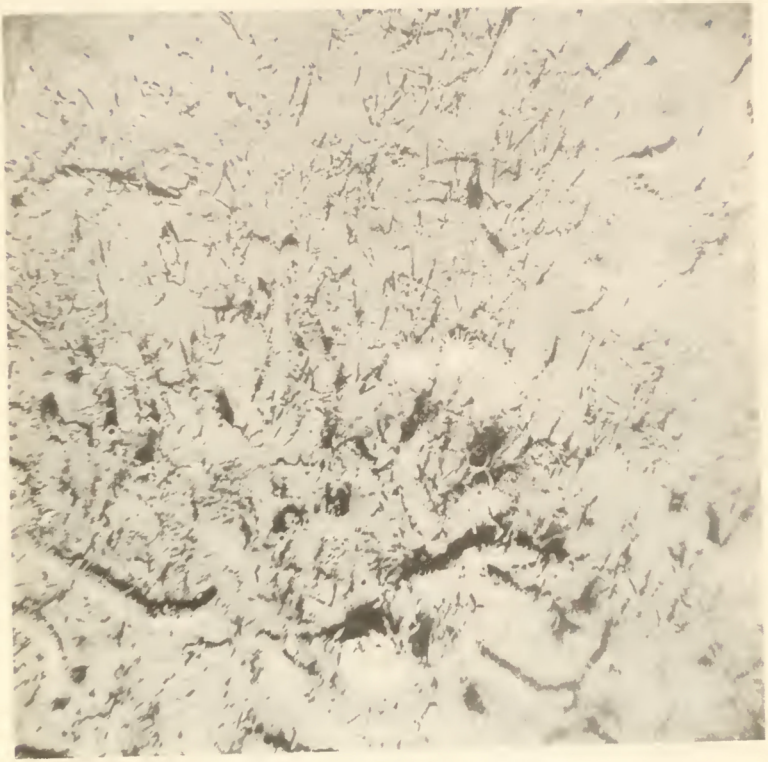
PLATE 8

Top. Seabottom at Sta. 7707, off Abalone Point, in 22.5 fms, showing projecting tubes of chaetopterids in a silty sediment.

Bottom. Largest individuals from the same sample, showing, from left to right, two tubes of *Chaetopterus variopedatus*, one of *Telepsavus costarum*, three *Lytechinus anamesus*, and two *Conus californicus* (the scale at bottom, refers to these specimens).



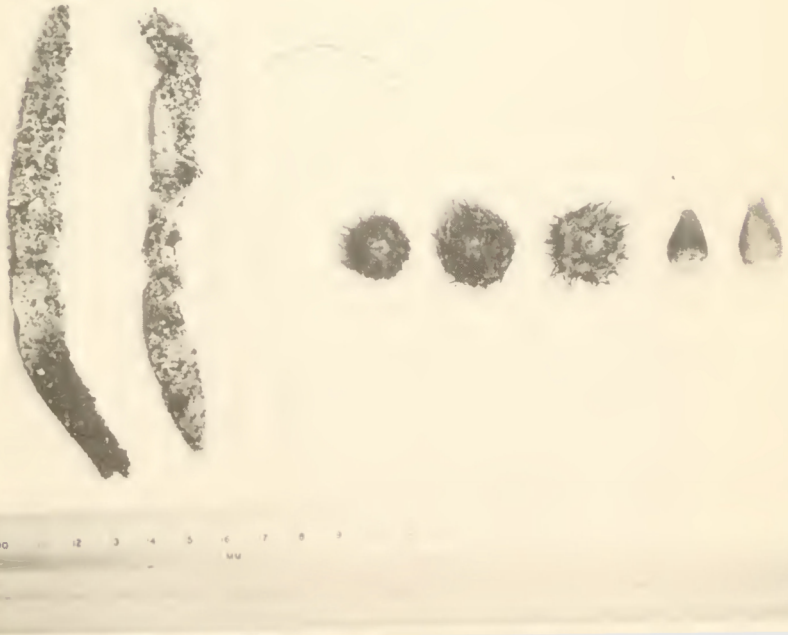


PLATE 9

Top. Seabottom at Sta. 7719, shelf off Abalone Point, in 23.5 fms, showing a silty surface with projecting tubes of *Chaetopterus variopedatus*, slenderer *Telepsavus costarum*, and *Lytechinus anamesus*.

Bottom. Seabottom at Sta. 7720, shelf off Abalone Point, in 23.5 fms, showing a silty bottom, similar to that at Sta. 7719, but with a seastar, *Mediaster aequalis*.

PLATE 10

Top. Seabottom at Sta. 7723, shelf off Jewfish Point, in 39.5 fms, showing a level silty bottom, with projecting rocks at lower left, solitary corals at upper left, and a dead shell fragment near center. The sampler failed to take a sample.

Bottom. Seabottom at Sta. 7725, shelf off Jewfish Point, in 40.5 fms, showing a silty surface with many small pits, mounds and projecting ophiuroid arms.

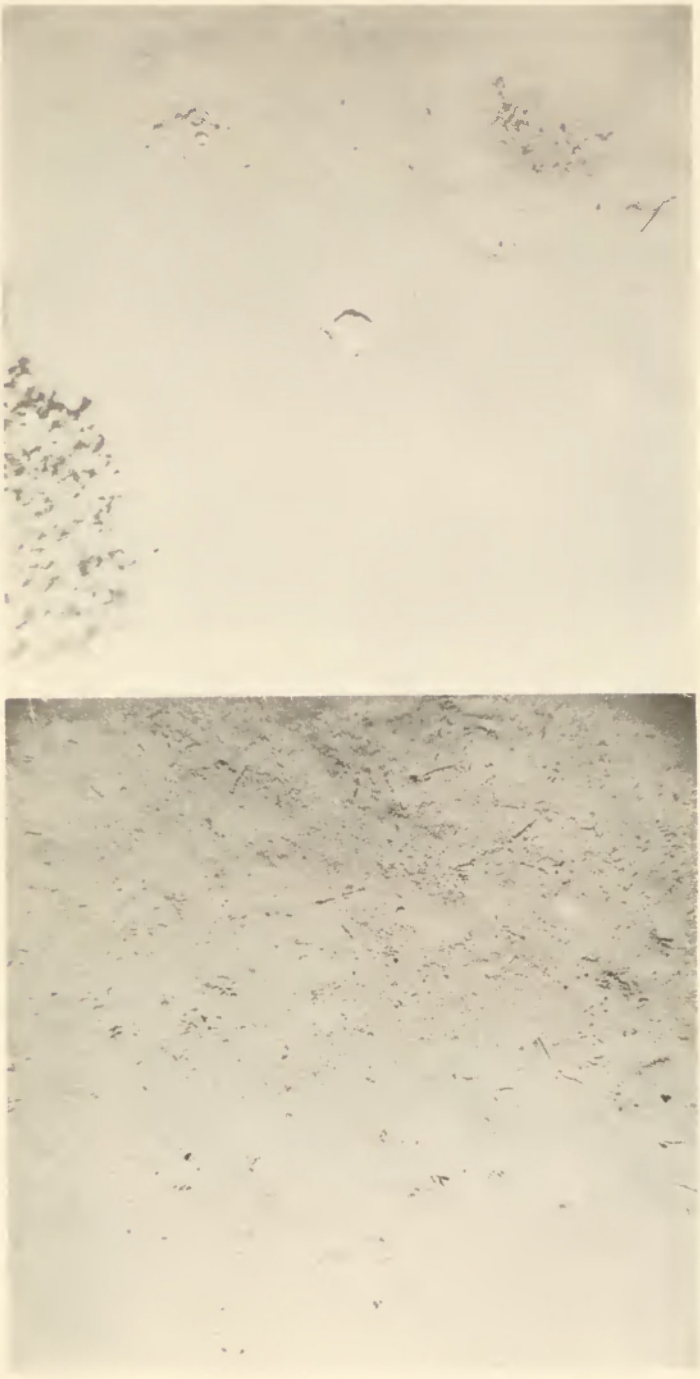


PLATE 11

Top. Seabottom at Sta. 7726, shelf off Jewfish Point, in 40 fms, showing a silty surface overlain with dead shells of the brachiopod, *Laqueus californicus*.

Bottom. Largest specimens from Sta. 7726, showing anterior end of *Euclymene* sp. with tube, and four dead valves of *Laqueus californicus*. The scale at bottom refers to these individuals.

PLATE 12

Top. Seabottom at Sta. 7712, basin slope southeast end of Santa Catalina Island, in 133 fms, coarse black sandy sediments, showing patch of ophiuroid arms at far right, and crescentic depressions formed by brissopsid urchins; the large trail across lower left has not been identified.

Bottom. The larger organisms from Sta. 7712, including *Brissopsis pacifica*, and tubes of polychaetes; the scale at bottom refers to these organisms.

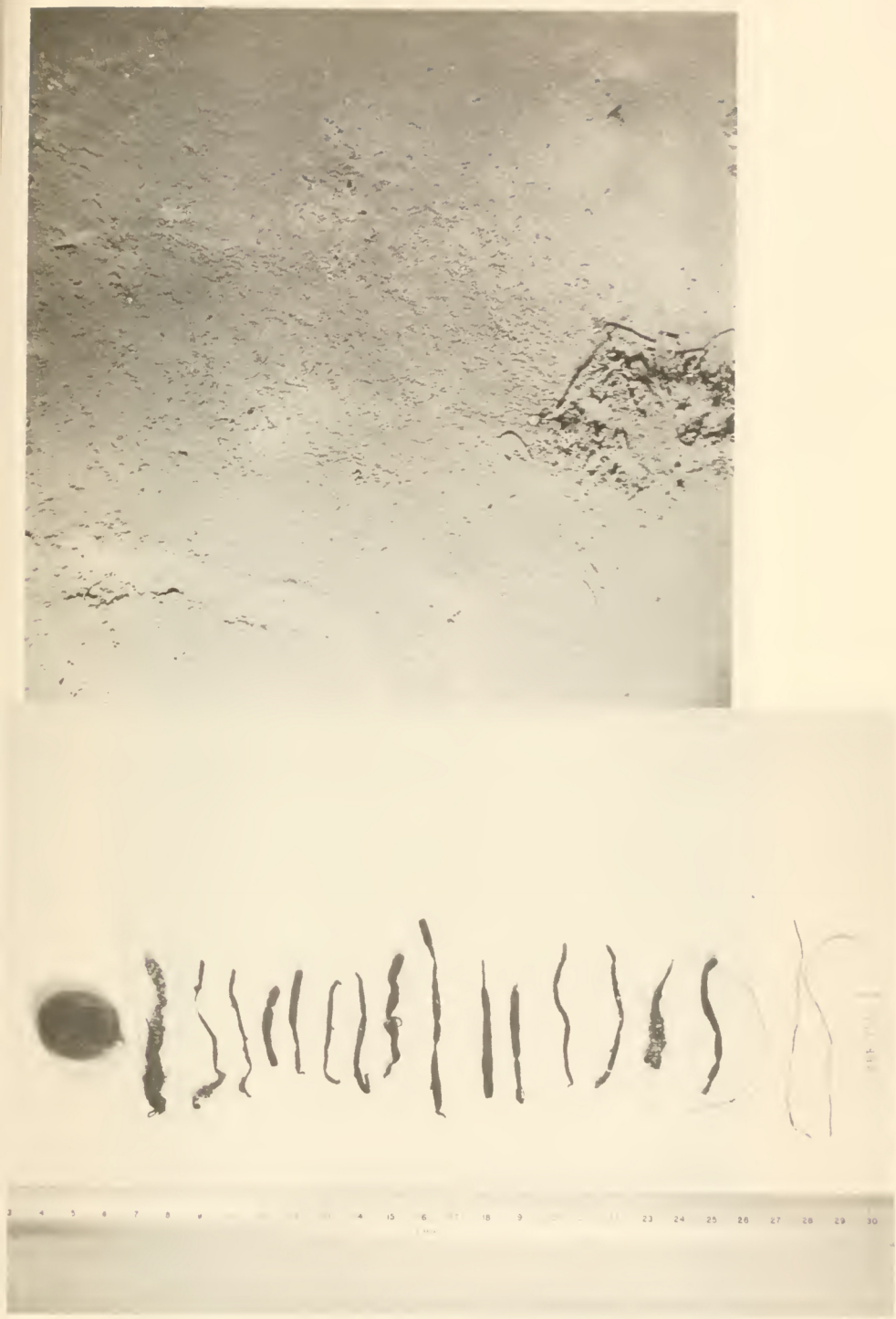
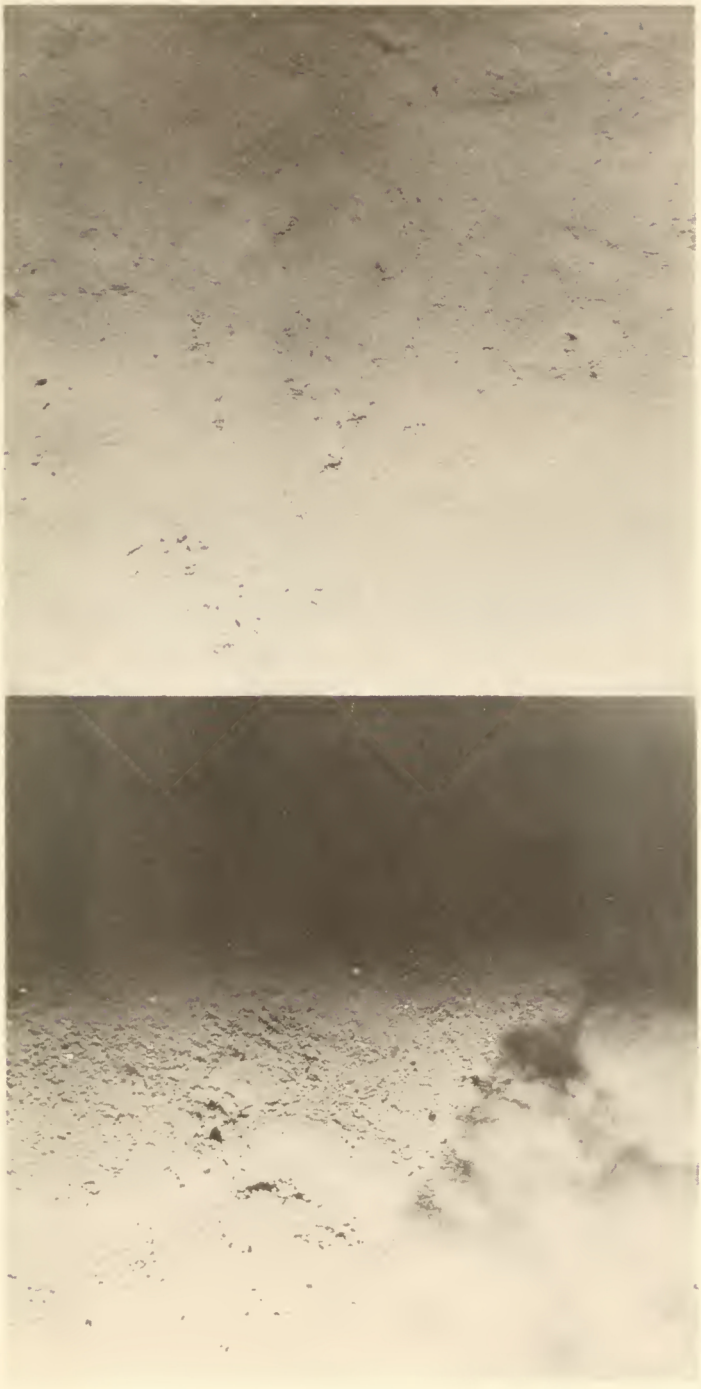


PLATE 13

Top. Sta. 7727, seabottom on the shelf off Jewfish Point, in 44 fms, at which no sample was taken. The photograph shows the surface riddled by pores and depressions, indicating the presence of many animals in the sediments.

Bottom. Sta. 7713, seabottom on basin slope, southeast of Santa Catalina Island, in 286 fms. Surface sediments are black sand and gravel with silt, and show pores, mounds and shallow trails with white shelly fragments.



INDEX OF SCIENTIFIC NAMES IN SYSTEMATICS SECTION

(Numbers in **bold face** refer to illustrations)