

the ventrals and anal, as well as those parts of the opercles where the bone is close to the outer skin, were of a chalky white. The corslet is bronzed brown in the alcoholic specimen.

There are four distinct bluish lines upon the sides, which are nearly parallel with the lateral line, and which constitute the most prominent specific character. The first of these begins directly under the tip of the pectoral, the second at the margin of the corslet, at a point in the line from the upper to the lower axillary angles of the pectoral. The third and fourth are rather indistinct anteriorly, but are very distinct in the posterior half of the body, and are about as far distant from each other as are the first two, the interval between the two pairs being slightly greater than that between the members of each pair, and equal to the diameter of the orbit. The first or uppermost line is nearly straight, the others, following the lower contour of the body, curve upward over the anal fin, and all four become lost in the darker color of the caudal peduncle.

This is without doubt the *Scomber Pelamis* of Linné, characterized by him as "*Scomber pinnulis inferioribus VII, corpore lineis utrinque quatuor nigris*" (Syst. Nat. ed. 10, 1758, i, p. 297), and given by Günther as *Thynnus pelamys* (Cat. Fish. Brit. Mus. ii, 1860, p. 364). It is hopelessly confused by Cuvier and Valenciennes with *Pelamys sarda*. Professor Poey assigned it to its present generic relations in 1868 (Syn. Pisc. Cubens. p. 362).

The geographical distribution of this species is not very well known, owing to the uncertainty of its synonymy. The British Museum has two stuffed specimens, one from the Cape Seas, and one from Yarrell's Collection of British fishes. Couch records it from the Frith of Clyde (July), and from Cumberland, England, and Ireland. Poey has it from Cuba. It has also been recorded from the seas of India and China.

The presence of this form upon our coast was first suggested by Messrs. E. G. Blackford and Barnet Phillips of New York, who recognized the species in New York Market from the plates in Couch's History of British Fishes. Only one was seen, and it was unfortunately not preserved. This was in the summer of 1873; and as none have since been found, it may be said, with some certainty, that the species is at present only accidental in our fauna.

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#### DISTRIBUTION OF CALIFORNIAN TERTIARY FOSSILS.

By W. H. DALL.

Further information has been received from Mr. Hemphill in regard to the Tertiary fossils enumerated lately in these Proceedings. These facts, having an important bearing on geological and faunal changes, are now summarized.

STRATA OF THE SAN DIEGO PENINSULA.

The long, low, narrow strip of land lying between San Diego Bay and the ocean is locally known as the Peninsula. It appears to have been pierced formerly by narrow channels or outlets by which the waters of the bay communicated with the sea, and even now, in heavy storms, the surf breaks over the barrier. At high-water mark is a stratum about four feet thick, containing fossils mingled in a confused manner, above which is a bed of fine sand extending to the surface of the peninsula, and having a total thickness of some twelve feet. From the lower bed (A) were obtained the following species:—

*Corbula luteola.*  
*Tellina modesta.*  
*Lucina Nuttallii.*  
*Pecten paucicostatus.*  
*Nucula exigua.*  
*Rhectaxis punctocœlata.*  
*Tornatina cœrealis.*  
*Tornatina eximia.*  
*Volvula cylindrica.*  
*Melampus olivaceus.*  
*Dentalium hexagonum.*  
*Vitrinella sp.*  
*Crucibulum spinosum.*  
*Crepidula adunca.*  
*Serpulorbis squamigerus.*  
*Litorina scutulata.*  
*Lacuna solidula.*  
*Rissoina Woodwardi?*  
*Myurella simplex.*

*Drillia Hemphillii.*  
*Mangilia angulata.*  
*Odostomia gracida.*  
*Turbonilla chocolata.*  
*Turbonilla virgo.*  
*Turbonilla torquata.*  
*Eulima micans.*  
*Scalaria indianorum.*  
*Cerithiopsis assimillata.*  
*Olivella biplicata.*  
*Olivella boetica.*  
*Nassa fossata var.*  
*Nassa perpinguis.*  
*Neverita, var. alta.*  
*Nitidella Gouldii.*  
*Amphissa versicolor.*  
*Pteronotus festivus.*  
 Fish teeth and a sp. of *Serpula*.

From the sand bed (B) were obtained,—

*Periploma argentaria.*  
*Macoma secta.*  
*Macoma indentata.*

*Macoma nasuta.*  
*Mactra californica.*

In the lowest part exposed of bed A are found *Cardium procerum*, *Dosinia ponderosa*, and *Anomia limatula*, but they do not seem to be scattered through the general body of the stratum.

STRATA OF THE MAINLAND.

On the mainland near the town of San Diego, the land is rather low, gradually rising inland toward some bluffs. To the eastward of the town, or what is known locally as the "railroad land", a stratum (A<sup>2</sup>) four or five feet thick is exposed at high-water mark, and, like the stratum A of the peninsula, contains a confused aggregation of fossils, at the bottom of which is a layer of the upper valves of *Anomia lima-*

*tula*, hardly mixed with any other species, and containing, so far as could be discovered, no perfect specimens or lower valves.

Stratum A<sup>2</sup> is regarded by Mr. Hemphill as the outcropping of an extensive formation, probably underlying the whole of the level land back to the bluffs, and presenting estuarine characters. It is surmounted by, or passes into, a fine sandy deposit (B<sup>2</sup>), at least seventy feet thick in some places, containing fossils scattered through it, and it is in this stratum that the fossils from the well were found. In nearly all the wells that have been sunk in San Diego, fossils have been found, showing that the bed is of wide extent as well as of great thickness.

The following fossils were afforded by stratum A<sup>2</sup>:—

<i>Pholadidea ovoidea.</i>	<i>Cardium procerum.</i>
<i>Solecurtus californianus.</i>	<i>Ostrea lurida.</i>
<i>Macoma sabulosa?</i>	<i>Anomia limatula.</i>
<i>Tellina Bodegensis.</i>	<i>Fissurellidea callomarginata.</i>
<i>Donax flexuosus.</i>	<i>Crucibulum spinosum.</i>
<i>Mactra falcata.</i>	<i>Cerithidea sacrata.</i>
<i>Clementia subdiaphana.</i>	<i>Drillia penicillata.</i>
<i>Chione simillima.</i>	<i>Scalaria indianorum.</i>
<i>Chione succincta.</i>	<i>Ranella muriciformis.</i>
<i>Dosinia ponderosa.</i>	<i>Nassa fossata.</i>
<i>Saxidomus aratus jun.</i>	<i>Nassa tegula.</i>
<i>Petricola pholadiformis?</i>	<i>Cerostoma Nuttallii.</i>

From the well-digging in stratum B<sup>2</sup> came,—

<i>Venericardia monilicosta.</i>	<i>Crepidula princeps.</i>
<i>Arca microdonta.</i>	<i>Turritella Cooperi.</i>
<i>Leda coelata.</i>	<i>Turbonilla stylina.</i>
<i>Pecten expansus.</i>	<i>Nassa mendica.</i>
<i>Janira dentata.</i>	<i>Cylichna alba.</i>
<i>Mamma nana.</i>	<i>Cadulus fusiformis.</i>

To which may be added the following species not enumerated from that locality in the list (pp. 11–12) in these Proceedings, but also obtained by Mr. Hemphill:—

<i>Glottidia albida</i> Hds.	<i>Lucina tenuisculpta</i> Cpr.
<i>Xylotrya</i> sp. (tubes).	<i>Cryptodon flexuosus</i> Mont.
<i>Cryptomya californica</i> Conr.	<i>Modiola recta</i> Conr.
<i>Solen rosaceus</i> Cpr.	<i>Nucula exigua</i> Sby.
<i>Solecurtus californianus</i> Conr.	<i>Acala Lyallii</i> Bd.
<i>Macoma expansa</i> Cpr.	<i>Pecten hastatus</i> Sby.
<i>Clementia subdiaphana</i> Cpr.	<i>Janira florida</i> Hds.
<i>Cardium centifilosum</i> Cpr.	<i>Ostrea conchaphila</i> Cpr.
<i>Lucina Nuttallii</i> Conr.	<i>Placunanomia macroschisma</i> Desh.
<i>Lucina acutilineata</i> Conr.	<i>Tornatina eximia</i> Bd.

*Cylichna cylindracea* Linn.  
*Dentalium hexagonum* Sby.  
*Dentalium semipolitum* B. & S.  
*Siphonodentalium pusillum?* Gabb.  
*Calliostoma annulatum* Martyn.  
*Galerus filusus* Gabb.  
*Crepidula navicelloides* Nutt.  
*Turritella Jewettii* Cpr.  
*Bittium asperum* Cpr.  
*Myurella simplex* Cpr.  
*Drillia* (four sp. undet.).  
*Surcula Carpenteriana* Gabb.  
*Mangilia variegata* Cpr.  
*Mangilia* (four sp. undet.).  
*Clathurella Conradiana* Gabb.  
*Odostomia straminea* Cpr. var.  
*Odostomia* sp.

*Turbonilla torquata* Cpr.  
*Eulina rutila* Cpr.  
*Scalaria subcoronata* Cpr.  
*Cancellaria* (four sp. undet.).  
*Neverita Recluziana* Petit.  
*Sigaretus debilis* Gld.  
*Ranella Mathewsonii* Gabb.  
*Olivella boetica* Cpr.  
*Nassa fossata* Gld.  
*Astyris tuberosa* Cpr.  
*Astyris* sp.  
*Ocenebra lurida* Cpr.  
*Pteronotus festivus* Hds.  
*Trophon orpheus* Gld.  
*Colus Dupetithouarsi?* Kien.  
*Volutopsis* (sp. undet.).  
*Chrysodomus Diegoensis* Dall.

About ten miles northward from San Diego, on the seacoast of California, are beds of coarse sandstone, of considerable thickness, dipping to the northward. About twenty feet of it (stratum C) are fossiliferous, containing the shells, not aggregated in a confused mass, as in some other cases above mentioned, but distributed much as they might have been while living. According to Mr. Hemphill, these fossils have not the aspect of an estuary deposit, but rather that of animals living in the open sea. *Pecten expansus* occurring in both the well (B<sup>2</sup>) formation and this sandstone, Mr. Hemphill supposes that they may be of identical age, but that the different assemblage of species may be due to the one being formed in an estuary and the other on an open coast. This sandstone bed contained, among others, the following species:—

*Pecten islandicus*.  
*Pecten hericeus*.  
*Pecten ventricosus*.  
*Pecten expansus*.  
*Pecten Stearnsii*.  
*Pecten Hemphillii*.  
*Pecten aquisulcatus* var

*Ostrea Veatchii*.  
*Lucina acutilineata*.  
*Opalia anomala*.  
*Opalia varicostata*.  
*Scalaria tinctoria*.  
*Scalaria Hemphillii*

Adjoining bed C, and composed of recent alluvial soil, eight or ten feet above tide-water, is another stratum (D), in which the specimens are in a poor state of preservation, and nearly all found living near San Diego at the present time. This bed afforded,—

*Laqueus californicus*.  
*Cumingia californica*.  
*Tapes staminea*.  
*Lucina acutilineata*.

*Axinea profunda*.  
*Acmæa mitra*.  
*Acmæa insessa*.  
*Fissurella volcano*.

*Chlorostoma Pfeifferi.*  
*Sureula Carpenteriana.*  
*Conus californicus.*  
*Neverita Recluziana.*

*Mitra maura.*  
*Monoceros engonatum.*  
*Purpura crispata.*  
*Fusus Harfordi.*

Near Santa Barbara, the outcrop (C<sup>2</sup>) upon the seabeach afforded a few fossils, some of which were similar to species obtained from the San Diego well. Among these were the following, all recent species:—

*Venericardia monilicosta.*  
*Bittium quadrifilatum.*  
*Bittium asperum.*  
*Lacuna vineta.*

*Astyris gausapata.*  
*Amphissa versicolor.*  
*Trophon orpheus? jun.*

The formation within whose limits the beds above described are to be included extends from the Pribiloff Islands southward, at least to Yesso Island, Japan, on the west, and to Chili on the east. A fruitful locality is at Cerros Island, Lower California, from whence *Waldheimia Kennedyi* Dall, and also a number of the species referred to in the preceding article, have been obtained, some of which are described by Gabb in the Paleontology of California.

Jurassic or Cretaceous beds appear to exist at Todos, Santos Bay, Lower California, not far from San Diego. Mr. Hemphill collected here, and has presented to the National Museum, half a dozen species not yet critically examined, but containing a fine specimen belonging to the *Rudiste*, which have hitherto been hardly known as American fossils.

MARCH 2, 1878.

**A REVISION OF THE AMERICAN SPECIES OF THE GENUS BREVOORTIA, WITH A DESCRIPTION OF A NEW SPECIES FROM THE GULF OF MEXICO.**

**By G. BROWN GOODE.**

The type of the genus *Brevoortia* of Gill is the species described in 1802 by Latrobe under the name of *Clupea tyrannus*, and later by Mitchill under the name of *Clupea menhaden*. As has been already indicated,\* the former name has the prior claim to adoption, and the species must be called *Brevoortia tyrannus*. Of this species, there appear to be two geographical races or varieties. One of these is the typical form of the Atlantic coast of the United States, the other a closely allied form from the coast of Brazil, already described by Spix under the name of *Clupanodon aureus*. For the northern form, the name of Mitchill should be retained, and the two varieties may be distinguished as *Brevoortia tyrannus* var. *menhaden*, and *Brevoortia tyrannus* var. *aureus*. On the coast of Patagonia and Paraguay occurs a well-marked species described by Jenyns under the name of *Alosa pectinata*. This species is readily

\* *Vide supra*, p. 8.