thirty feet across. It comes fresh out of the ground and is not more than 100 yards behind a mangrove swamp on level ground in the jungle. In this spring at least twenty-eight species of freshwater snails were collected in two hours. With thorough collecting it is possible that the spring would perhaps yield a dozen more species of shells. Many of the species taken from the spring were not found elsewhere and seem to be highly localized while others have a wide distribution.

THE GASTROPOD FAUNA OF THE INTERTIDAL ZONE AT MOSS BEACH, SAN MATEO COUNTY, CALIFORNIA

BY H. E. VOKES
University of California, Berkeley

The gastropod fauna here listed was collected during a five weeks' period involving the latter part of the month of June and the month of July, 1933. A total of 126 species are represented in the collection, 21 of which are reported from beyond the previously known range of the species.

The intertidal zone at Moss Beach, consists of a series of truncated strata of fine grained, black, sandstones of Pliocene age, striking at an angle from the shore, so that at low tide an area almost 300 feet wide is exposed on which are developed a large number of tide pools protected from the action of the waves by the edges of the strata which dip toward the sea. The region from which the collections were made lies southward from the town of Moss Beach to Pillar Point, a distance of approximately three miles. Pillar Point marks the northern limit of Halfmoon Bay, a down-faulted block which being low lying, has a sandy bottom and supports an entirely different faunal assemblage from that found at Moss Beach.

In the following check-list species represented in the collection which occur only at Pillar Point and probably have been washed up by wave action from the sands of Halfmoon Bay are indicated by a dagger (†) and the forms represented in the collections from all points by empty shells only are indicated by an asterisk (*). The gastropod species found are:
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Haminoea vesicula (Gould), 1855
Gadinia reticulata (Sowerby), 1835
Arctonchis borealis (Dall), 1871
Conus californicus Hinds, 1844
†*Clathrodrillia (Moniliopsis) incisa (Carpenter), 1865
†*Clathrodrillia (Moniliopsis) incisa var. ophioderma (Dall), 1908
†*Pseudomelatoma torosa (Carpenter), 1865
Mangelia (Bela) variegata Carpenter, 1864
†*Olivella biplicata Sowerby, 1825
Cypraeolina pyriformis (Carpenter), 1865
†*Mitra idae Melvill, 1893
Scarllesia dira (Reeve), 1846
†*Nassarius (Schizopyga) fossatus (Gould), 1843
Nassarius (Schizopyga) cooperi (Forbes), 1850
Mitrella carinata (Hinds), 1844
Mitrella carinata var. gausapata (Gould), 1851
Mitrella gouldii (Carpenter), 1857
Mitrella tuberosa (Carpenter), 1864
Amphissa columbiana Dall, 1916
Amphissa versicolor, 1871
Amphissa bicolor Dall, 1892
Purpura foliata Martyn, 1784
Tritonalia lurida (Middendorff), 1849
Tritonalia lurida var. aspera (Baird), 1863
Tritonalia lurida var. munda (Carpenter), 1864
Tritonalia lurida var. rotunda Dall, 1919
*Tritonalia painei Dall, 1903
Tritonalia circumtexta (Stearns), 1871
Tritonalia interfossa (Carpenter), 1864
Tritonalia interfossa var. atropurpurea (Carpenter MS) Dall, 1919
Tritonalia foveolata (Hinds), 1843
*Tritonalia subangulata (Stearns), 1873
Thais (Nucella) lamellosa (Gmelin), 1792
Thais (Nucella) lima (Martyn), 1784
Thais (Nucella) canaliculata (Duclos), 1832
Thais (Nucella) emarginata (Deshayes), 1839
Thais (Nucella) emarginata var. ostrina (Gould), 1852
Acanthina (Acanthinucella) spirata (Blainville), 1832
*Epitonium (Opalia) wroblewskii (Morch), 1876
Epitonium (Nitidiscala) crebricostatum (Carpenter), 1866
Epitonium (Nitidiscala) indiannorum (Carpenter), 1865
Epitonium (Nitidiscala) tinctum (Carpenter), 1865
*Turbonilla sp. indet.
Odostomia (Chrysallida) astricta Dall and Bartsch, 1907
Odostomia (Chrysallida) oregonensis Dall and Bartsch, 1907
Odostomia (Chrysallida) n. sp.
Odostomia (Iolaea) amianta Dall and Bartsch, 1907
Odostomia (Evalea) tenuisculpta Carpenter, 1864
Odostomia (Evalea) valdezi Dall and Bartsch, 1907
Odostomia (Evalea) sp. cf. to Dall and Bartsch, 1903
Odostomia (Evalea) n. sp.
Odostomia (Amaura) moratora Dall and Bartsch, 1909

*Trivia californiana (Gray), 1828
*Erato vitellina Hinds, 1844

Cerithiopsis (Cerithiopsidella) cosmia Bartsch, 1907

Bittium (Stylium) eschrichtii (Middendorff) var. monereyense Bartsch, 1907

Bivonia compacta Carpenter, 1864

Spirogyphus lituellus (Morch), 1861

Littorina planaxis Nuttall in Philippi, 1847

Littorina (Melarhaphe) scutulata Gould, 1849

Lacuna porrecta Carpenter, 1864

Lacuna solidula Loven var. carinata Gould, 1846

Lacuna variegata Carpenter, 1864

Lacuna marmorata Dall, 1919

*Iselica fenestrata (Carpenter), 1864

Diala acuta Carpenter, 1864

Barleeia haliotiphila Carpenter, 1864

Barleeia oldroydi Bartsch, 1920

Cingula monereyensis Bartsch, 1912

Cingula californica Tryon, 1865

Alvania compacta Carpenter, 1865

Alvania n. sp. A

Alvania n. sp. B

Hipponyx serratus Carpenter, 1857

Hipponyx antiquatus (Linnaeus), 1767

Crepidula convex Say, 1822

Crepidula adunca Sowerby, 1825

Crepidula exuviata Nuttall, 1859

Crepidula nivea C. B. Adams, 1852

Crepidula (Crepipatella) lingulata Gould, 1846

†*Polinices (Euspira) lewisi (Gould), 1847

†*Polinices (Euspira) draconis Dall, 1903

Lamellaria rhombica Dall, 1871

Velutina laevigata (Linnaeus), 1767

Acmaea mitra Eschscholtz, 1833

Acmaea pelta Eschscholtz, 1833

Acmaea scutum Eschscholtz, 1833

Acmaea ochracea Dall, 1871

Acmaea digitalis Eschscholtz, 1833
Acmaea lomatula Carpenter, 1866
Acmaea scabra (Gould), 1846
Acmaea persona Eschscholtz, 1833
Acmaea instabilis Gould, 1846
Acmaea incessa (Hinds), 1842
Acmaea asmi (Middendorff), 1849
Acmaea palacea Gould, 1851
Acmaea cribaria (Gould MS) Carpenter, 1834
Lottia gigantea Gray, 1834
Tricolia complata (Gould), 1855
Tricolia pulloides (Carpenter), 1865
*Astraea (Pachypoma) inaequalis (Martyn), 1784
Homalopoma carpenteri (Pilsbry), 1888
Homalopoma bacula (Carpenter), 1864
Tegula (Chlorostoma) funebralis (A. Adams), 1854
Tegula (Chlorostoma) brunnea (Philippi), 1848
Tegula (Chlorostoma) montereyi (Keiner), 1850
*Tegula (Promartynia) pulligo (Martyn), 1784
*Tegula (Omphalius) ligulata (Menke), 1850
Calliostoma costatum (Martyn), 1784
Calliostoma costatum var. caeruleum Dall, 1919
Calliostoma costatum var. pictum Dall, 1919
Calliostoma canaliculatum (Martyn), 1784
†*Calliostoma tricolor Gabb, 1865
Margarites (Pupillaria) pupillus (Gould), 1849
Margarites (Pupillaria) salmonea Carpenter, 1864
Margarites (Lirularia) lirulatus (Carpenter), 1864
Margarites (Lirularia) succincta (Carpenter), 1864
*Haliotis cracherodii Leach, 1817
Haliotis rufescens Swainson, 1822
Megatebennus bimaculatus (Dall), 1871
Megatebennus sp.
Diadora aspera (Escholtz), 1833

The occurrence at Moss Beach of several of these species is beyond their previously reported range. The majority of these forms have not heretofore been reported north of the vicinity of Monterey, California; those species in the following list indicated with an asterisk not being reported outside of Monterey Bay in the past. Included in the species for which the Moss Beach occurrence represents a new northern limit are:

Pseudomelatoma torosa (Carpenter), 1865
Mangelia (Bela) variegata Carpenter, 1864
Tritonalia foveolata (Hinds), 1834
Tritonalia subangulata (Stearns), 1873  
Epitonium (Nitidiscala) tinctum (Carpenter), 1865  
*Odostomia (Chrysallida) astricta Dall and Bartsch, 1907  
Odostomia (Iolae) amianta Dall and Bartsch, 1907  
*Odostomia (Evalea) valdezi Dall and Bartsch, 1907  
Cerithiopsis (Cerithiopsidella), cosmia Bartsch, 1907  
Diala acuta Carpenter, 1864  
*Cingula montereyensis* Bartsch, 1912  
Hipponix serratus Carpenter, 1857  
*Acmaea ochracea* Dall, 1871  
Tricoli a compta (Gould), 1855  
Tricoli a pulloides (Carpenter), 1865  
Tegula (Omphalius) ligulata (Menke), 1850  
Calliostoma tricolor Gabb, 1865  
*Margarites (Pupillaria) salmonea* Carpenter, 1864

In so far as the writer is aware, the presence of *Crepidula convexa* Say in the collections from Moss Beach, represents the first record of the occurrence of this species in the waters of the Pacific Ocean proper, though it has been part of the fauna of San Francisco Bay for some time. The migration of this species will be commented upon in a forthcoming paper.

New southern limits are indicated for the range of two species. Of these, *Odostomia (Amaura) moratora* Dall and Bartsch, 1909, has not been reported from any locality other than at Point Reyes, from where it was described; and *Alvana compta* Carpenter, 1865, has not been collected south of Trinidad, California.

The number of species reported beyond their previously known range is not remarkable when one considers the fact that the great majority of studies of the California molluscan faunas have been made at a very few localities. San Diego, San Pedro, Santa Barbara, Monterey, and to a lesser extent Newport, Catalina Island, Farallones, Bodega Bay, Fort Bragg and Trinidad represent the areas from which nearly all our collections have been made, and the faunas of the intervening areas are as yet practically unknown.