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GEOLOGY.

VOL. I, No. 6.

The Fauna of the Sooke Beds
of Vancouver Island.

BY

JOHN C. MERRIAM.

WITH ONE PLATE.

Issued March 6, 1899.

SAN FRANCISCO:
PUBLISHED BY THE ACADEMY.
1899.

THE FAUNA OF THE SOOKE BEDS OF VANCOUVER ISLAND.

BY JOHN C. MERRIAM.

THE SOOKE beds, so named from their occurrence in the Sooke district, on the southern coast of Vancouver Island, have been principally studied in the field by Dr. C. F. Newcombe of Victoria, B. C., the fossil invertebrates collected by him being placed at the disposal of the writer for study and description. As the result of the investigation of this material, together with that from other horizons, the author has, during the past two years, published two diagnostic notes¹ on this fauna.

As no figures of the new species have been published, and as investigation of this fauna is not easily combined with any other to which the writer is at present giving particular attention, it was thought best to bring together in one note the principal facts known regarding the fauna, furnishing also figures of the new species. Future investigation will probably add many new forms to the list given in this paper.

The first mention of the Sooke beds made in the literature is by Mr. James Richardson,² who in 1876 noticed the occurrence of fossiliferous rocks in the Sooke district. The following extract from his paper expresses his opinion of the beds:—

“At the mouth of John’s River the lowest beds are gray sandstone, in some places crowded with fossils belonging

¹ “Note on Two Tertiary Faunas from the Rocks of the Southern Coast of Vancouver Island,” Bull. Dep’t Geol., Univ. Cal., Vol. II, No. 3, Dec., 1896.

“New Species of Tertiary Mollusca from Vancouver Island.” Nautilus, Vol. XI, October, 1897, p. 64.

² Geol. Surv. Canada, Rept. Prog., 1876-77, pp. 160-192.

apparently to three or four species. These are referable to the genera *Ostrea*, *Pecten*, and *Saxidomus*, and are either of Tertiary or Post-Tertiary age."

In 1892 Dr. W. H. Dall¹ mentioned the occurrence of marine beds of Miocene age near Sooke.

Dr. Newcombe has, in 1893-98, made numerous visits to the outcroppings of the beds near Muir and Coal Creeks, bringing back a considerable amount of material in a very good state of preservation.

The cliffs in which the fossils occur are said by Dr. Newcombe to consist of soft sandstone and conglomerate. The strata do not appear to be greatly disturbed. Molluscan remains are found in abundance in both the sandstone and the conglomerate. In most instances the specimens are well preserved, showing the original unchanged material of the shell.

The number of known species being small, it is perhaps not possible to determine with absolute accuracy the age of this horizon. The recent and extinct species are, however, about evenly divided, so that both the Quaternary and the Eocene are beyond the range of possibility. Within the limits of the Neocene the nearly equal number of extinct and living forms points to Middle Neocene, while the general relationships of the fauna to the known Miocene and Pliocene faunas of the coast show no preponderance of affinity in either direction. The total evidence available seems then to indicate the Middle Neocene age of the Sooke fauna.

¹ Bull. U. S. Geol. Surv., No. 84, p. 230.

TABLE ILLUSTRATING THE
RELATIONSHIPS OF THE SOOKE FAUNA.

	Recent.	Pliocene, Calif.	Miocene, Calif.	Astoria Miocene, ¹	Extinct.
1. <i>Placunanomia macroschisma</i> DESH.....	*	*	*	*	
2. <i>Mytilus edulis</i> LINN.....	*	*	*	*	
3. <i>Cerithidea Californica</i> HALD.....	*	*	*	*	
4. <i>Acmaea mitra</i> ESCH.....	*	*	*	*	
5. <i>Crepidula rugosa</i> NUTT. (aff.).....	*	*	*	*	
6. <i>Pecten requisulcatus</i> CARP. (conf.).....	*	*	*	*	
7. <i>Pecten hastatus</i> SOWB. (conf.).....	*	*	*	*	
8. <i>Chrysodomus dirus</i> REEVE.....	*	*	*	*	
9. <i>Yoldia impressa</i> CON.....	*	*	*	*	*
10. <i>Pectunculus patulus</i> CON.....	*	*	*	*	*
11. <i>Trochus inornata</i> GABB.....	*	*	*	*	*
12. <i>Sinum scopulosum</i> CON. (conf.).....	*	*	*	*	*
13. <i>Cytherea</i> (?) <i>Newcombei</i> MERRIAM.....	*	*	*	*	*
14. <i>Cytherea Vancouverensis</i> MERRIAM.....	*	*	*	*	*
15. <i>Patella gemetrica</i> MERRIAM.....	*	*	*	*	*
16. <i>Nassa Newcombei</i> MERRIAM.....	*	*	*	*	*
17. <i>Bullia buccinoides</i> MERRIAM.....	*	*	*	*	*
18. <i>Fusus</i> sp. nov.....	*	*	*	*	*
19. <i>Fusus</i> sp. nov.....	*	*	*	*	*
20. <i>Bittium</i> sp. nov. (?).....	*	*	*	*	*
21. <i>Crepidula</i> sp.....	*	*	*	*	*
22. <i>Ostrea</i> sp.....	*	*	*	*	*
23. <i>Cardium</i> sp.....	*	*	*	*	*
24. <i>Cerithidea</i> sp.....	*	*	*	*	*
25. <i>Tapes</i> (?) sp.....	*	*	*	*	*

¹ Referring to the fauna described by Conrad from Astoria and identified by the writer at Carmanah Point, Vancouver Isl. See BULL. Dep't Geol., Univ. Cal., Vol. II, No. 3, p. 102.

The following species which have previously been diagnosed by the writer are here redescribed and figured:

Genus *Cytherea* Lamarck.

Cytherea (?) *Newcombei* Merriam.

PLATE XXIII, FIGS. 1 AND 1a.

Cytherea, sp. nov., Bull. Dep't Geol., Univ. Cal., Vol. II, No. 3, p. 106.

Cytherea Newcombei MERRIAM, Nautilus, Vol. XI, 1897, p. 64.

Shell subquadrate to oval, high, moderately thick, truncated anteriorly. Beaks not prominent. Lunule faintly marked. Surface ornamented with numerous, irregularly placed growth lines and ridges. On some well preserved specimens a large number of very faint, radial lines are visible. Length of large specimens 70 mm., breadth 55 mm. Hinge of right valve with three cardinal teeth and a short pit for the anterior lateral tooth of the opposite valve. This pit for the reception of the anterior lateral tooth is shallower and much shorter than in the following species.

Cytherea Vancouverensis Merriam.

PLATE XXIII, FIG. 2.

Cytherea, sp. nov., Bull. Dep't Geol., Univ. Cal., Vol. II, No. 3, p. 106.

Cytherea Vancouverensis MERRIAM, Nautilus, Vol. XI, 1897, p. 64.

Shell oval, narrowly rounded anteriorly. Beaks prominent. Lunule well marked. The somewhat weathered surface of the shells ornamented by numerous, irregularly-placed growth ridges. Length of type specimen 62 (?) mm., breadth 48 mm. Hinge of right valve with three cardinal teeth and a long, deep tooth-pit for the reception of the anterior lateral tooth of the left valve. Pit between the two anterior cardinal teeth of the right valve ordinarily narrower and deeper than in *C. Newcombei*.

Genus *Patella* Linné.

Patella geometrica Merriam.

PLATE XXIII, FIG. 4.

Patelloid, sp. nov., Bull. Dep't Geol., Univ. Cal., Vol. II, No. 3, p. 106.

Patella geometrica MERRIAM, Nautilus, Vol. XI, 1897, p. 65.

Shell large and heavy, up to 50 mm. or more in length, suborbicular. Apex elevated, well forward. Surface ornamented by about twenty broad, strong, radial ribs, which are much wider than the interspaces. Radial ribs crossed by numerous prominent, narrow, sometimes leafy, transverse ridges.

Genus *Nassa Martini*.

Nassa Newcombei Merriam.

PLATE XXIII, FIG. 3.

Nassa, sp. nov., Bull. Dep't Geol., Univ. Cal., Vol. II, No. 3, p. 106.
Nassa Newcombei MERRIAM, Nautilus, Vol. XI, 1897, p. 65.

Shell between 25 and 30 mm. in length. Whorls five, with a well marked shoulder, ornamented by numerous longitudinal and transverse ribs which give the middle portion of the whorls a tessellated appearance. The upper revolving rib, which forms the angle of the shoulder, is stronger than the others and is usually separated from them by a distinct groove. On the last whorl the transverse ribs (about 25) are dominant on the upper portion, excepting the shoulder, and are latticed by the less conspicuous revolving sculpture. On the lower portion of the whorl the transverse ribs disappear leaving the well defined revolving ribs uninterrupted.

Genus *Bullia Gray*.

Bullia buccinoides Merriam.

PLATE XXIII, FIG. 5.

Ancillaria, sp. nov., Bull. Dep't Geol., Univ. Cal., Vol. II, No. 3, p. 106.
Bullia buccinoides MERRIAM, Nautilus, Vol. XI, 1897, p. 65.

Shell ovate, whorls five. Spire short. Suture partially or entirely covered. Aperture with strong anterior notch. Outer lip thin, sharp; inner lip with broad callus. Length 25-30 mm.

PALÆONTOLOGICAL LABORATORY,
UNIVERSITY OF CALIFORNIA,
BERKELEY, CALIFORNIA,
September, 1898.

EXPLANATION OF PLATE XXIII.

All figures natural size.

Parachione
Newcombei
Pancuione
Matthewsonii

Fig. 1. *Cytherea* (?) *Newcombei* MERRIAM.Fig. 1a. Doubtful hinge of right valve of *Cytherea* (?) *Newcombei*.Fig. 2. *Cytherea Vancouverensis* MERRIAM.Fig. 3. *Nassa Newcombei* MERRIAM.Fig. 4. *Patella geometrica* MERRIAM.Fig. 5. *Bullia buccinoides* MERRIAM.

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MARY H. WELLMAN DEL.

LITH. BY T. H. ANDERSON

FIG. 1-10 CYTHEREA NEWCOMBI MERRIAM

FIG. 2 CYTHEREA VANCOUVERENSIS MERRIAM

FIG. 3 MASSA NEWCOMBI MERRIAM

FIG. 4 PATELLA GEOMETRICA MERRIAM

FIG. 5 BULLIA BUCCINOIDES MERRIAM