

## A New Alaskan *Macoma*

(Mollusca : Bivalvia)

BY

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(2 Plates; 1 Text figure)

DURING THE GREAT ALASKA Earthquake of 27 March 1964, MacLeod Harbor on Montague Island in Prince William Sound was uplifted approximately 9.6m. This elevation change probably occurred during a 3 - 5 minute period and it was not followed by a tsunami wave. Only those organisms that were washed free with the receding water and were not trapped in pools escaped. With the subtidal delta of MacLeod Creek exposed, the creek rapidly cut new channels 2 - 3m below the surface of the previous delta. Mollusk shells from the original delta formed windrows on the new beach line.

After the earthquake, the State of Alaska Department of Fish and Game did extensive sampling in Prince William Sound to measure the effects of the change in land elevation on clam resources (BAXTER, 1971). Among the approximately 174 species of mollusks collected in MacLeod harbor was a number of *Macomas*: *Macoma balthica* (Linnaeus, 1758); *M. brota* Dall, 1916; *M. expansa* Carpenter, 1864; *M. inquinata* (Deshayes, 1855); *M. obliqua* (Sowerby, 1817); and one *Macoma* that was somewhat similar to *M. expansa*. A literature search (especially DALL, 1900; COAN, 1971; DUNHILL & ELLIS, 1969) and examination of type specimens and collections in the U. S. National Museum, the California Academy of Sciences, the Los Angeles County Museum of Natural History, and the Marine Collections, University of Alaska was made, and the indications were that this species of *Macoma* was not previously described.

The collection of the undescribed *Macoma* was made in July 1965 and consisted of 6 connected pairs of valves without their soft parts. There were the dried remains of the adductor muscles in 1 pair. Thus 5 of the clams appeared to have been killed by the uplift 16 months before, and the other probably had been dead approximately a month based on observed decay rates of other species of clams following the earthquake in other areas of Prince William Sound. Only a few specimens of each species were being collected during the survey from any one area and it was not recognized at the time of collection that this

clam was different from *M. expansa*. Subsequently it has not been feasible to examine MacLeod Harbor for more specimens.

Four pairs of valves, 2 pairs with the left valve crushed, of this species were located in the marine collections of the University of Alaska, Fairbanks. They were stomach contents of the starry flounder, *Pleuronectes stellatus* (Pallas, 1811), obtained by personnel of the University by trawling off Icy Cape, Alaska.

TELLINIDAE Blainville, 1814

*Macoma* LEACH, 1819

*Macoma dexioptera* Baxter, spec. nov.

**Diagnosis:** Shell is egg-shaped, evenly pointed posteriorly and well rounded anteriorly; moderately compressed, widest just anterior of the beaks; beaks slightly projecting above dorsal margins. Shell height averages 66% of length; average width is 28% of length; beaks are central, averaging 54% of the length posteriorly from the anterior end; dorsal margins straight, meeting at the beak at an average angle of 145°; posterior end with a slight to a very slight flexure to the right; antero-dorsal margin of the right valve overlaps that of the left valve, the length of the overlapping "wing" averages 26% of the shell length; the antero-dorsal margin of the left valve is straight. The shell is thin, with a weak hinge and small, delicate cardinal teeth. These hinge teeth are normal for the genus. The larger bifurcate cardinal tooth is the anterior one in the left valve and is the posterior one in the right valve. The other cardinal tooth in each valve is laminar. All cardinal teeth have a narrow base and then swell slightly to a bulbous distal end. They tend to be broken off in most specimens, especially the larger bifurcate teeth.

The pallial sinuses are large, that of the left valve slightly the larger; pallial sinus depth averages 70% of



the shell length in the left valve and 64% in the right valve; pallial sinus lines in both valves have a dorsal "hump." Pallial sinus line in the left valve meets the pallial line at an average anterior angle of  $47^\circ$ , with a small amount of overlap; the pallial sinus lines join the pallial line slightly anterior to the beaks; the joined posterior portion of the left pallial line averages 37% of the shell length.

The anterior cruciform muscle scar occurs ventrally and even with the posterior end of the pallial line. The posterior cruciform muscle scar is double with the larger scar the posterior one and both lie ventrally and posteriorly to the posterior tip of the pallial line.

Shell color is white, with a thin shiny pale-straw colored periostracum that is present on the outer margins of

the shell and tends to be worn off near the beaks. External sculpture on the shell consists of very low growth lines, strongest at the period of winter growth cessation; and an imperfect ridge or fold along the dorsal margin from the beak to the posterior end of the shell. The periostracum has extremely faint radial lines on it that do not appear on the shell.

**Measurements of the Holotype:** length 39.2 mm; height 25.7 mm; width 11.2 mm (see Table 1 for additional measurements of holotype and paratypes).

**Type Locality:** MacLeod Harbor, Montague Island, Prince William Sound, Alaska, U. S. A. ( $59^\circ 53.4' N$ ;  $147^\circ 49.8' W$ ) from beach drift at the head of MacLeod Harbor on the north side of the bay.

Table 1

## Measurements of Holotype and Paratypes

The holotype and 2 of the paratypes were placed in institutions prior to the establishment of the measurements considered significant for comparisons of the different species of Tellinidae. Therefore, some measurements are missing. Measurement positions and definitions are given

in the appendix. Measurements were taken with a vernier caliper to the nearest tenth of a millimeter, by a micrometer eye piece to the nearest hundredth of a millimeter, or by use of a protractor to the nearest degree.

	Holotype	Paratypes				
	CAS 55801	CAS 48843	LACM 1786	USNM 711116	UA M802	RB EK 1058e
Length, millimeters	39.2	31.4	34.3	33.0	27.3	26.5
Height, mm	26.2	21.7	23.0	20.4	18.3	17.3
Width, mm	11.2	8.8	10.0	8.5	7.9	6.9
Anterior length, mm	20.3	16.6	17.8	17.2	14.6	14.3
Ligament length, mm	8.4	6.2	6.6	6.1	5.8	5.7
Ligament width, mm	—	—	—	1.1	1.2	1.0
Angle of posterior flexure to the right, $^\circ$	14	—	—	9	6	6
Angle of dorsal margins, $^\circ$	142	149	142	152	141	143
Age, years	$\pm 17$	6	$\pm 13$	6	5	4
LEFT VALVE MEASUREMENTS						
Pallial line length, mm	25.6	19.2	21.6	21.8	16.7	16.7
Posterior pallial line length, mm	15.6	10.9	10.6	13.3	10.8	10.0
Pallial sinus, total length, mm	—	—	—	23.2	20.0	18.5
Pallial sinus, adductor length, mm	16.1	12.8	13.1	14.5	12.4	11.1
Pallial sinus height, mm	11.5	8.4	8.9	8.0	8.2	7.0
Anterior angle at junction of pallial sinus line with pallial line, $^\circ$	62	56	47	42	44	56
RIGHT VALVE MEASUREMENTS						
Pallial line length, mm	—	—	—	21.0	16.6	16.3
Posterior pallial line length, mm	13.4	10.5	10.0	14.2	10.2	9.4
Pallial sinus, total length, mm	—	—	—	21.3	18.7	17.4
Pallial sinus, adductor length, mm	14.5	12.8	11.9	13.5	11.6	10.4
Pallial sinus height, mm	10.8	7.3	8.2	7.7	8.0	6.5
Antero-dorsal "wing" length, mm	9.0	—	8.4	7.5	6.8	4.7
Antero-dorsal "wing" overlap of left valve, mm	0.8	—	0.6	0.66	0.44	0.24



**Distribution:** Known from type locality and from stomach contents of *Pleuronectes stellatus* obtained in about 20m off Icy Cape, Alaska (approximately 59°57'N; 141°50'W).

**Habitat:** No live specimens have been collected. Because of the presence of *Macoma dextioptera* with *M. expansa* and *Siliqua patula* Dixon, 1788, mollusks that utilize the same type of clean sand habitat, and because of the similarity of shell color and periostracum condition to *M. expansa*, it is probable that the habitat in MacLeod Harbor of *M. dextioptera* and *M. expansa* are similar.

The habitat of *Macoma expansa* and *M. lama* Bartsch, 1929 is in clean sand on semi-protected beaches with moderate surf, from the low intertidal into the subtidal zone. This type of habitat was common in MacLeod Harbor prior to the uplift. *Macoma lama* has been collected with *M. expansa* in other areas of Alaska, but it was not noted in MacLeod Harbor. As adults, *M. expansa* and *M. lama* lie flat on their left side 10 to 23cm below the substrate surface. Both are capable of rapidly re-digging themselves into the substrate if dislodged.

The *Pleuronectes stellatus* samples were caught on a sandy bottom.

**Discussion:** *Macoma dextioptera* is most similar to *M. expansa* with which it was associated in the beach drift, and to a lesser extent to *M. lama*. All 3 species have comparatively thin, porcellaneous shells, a smooth, polished periostracum, a centrally located beak, and are flexed about the same amount to the right posteriorly. The most conspicuous differences are the antero-dorsal margin on the right valve of *M. dextioptera* which overlaps the margin of the left valve, and the evenly pointed posterior end of the shell. *Macoma lama* is separated from this new species by having markedly unequal pallial sinuses, straighter postero-dorsal shell margin, lack of an overlap of the right antero-dorsal shell margin, a deeper shell, average depth is 72% of its length, its posterior end more ventrally oriented, the anterior cruciform muscle scar antero-ventral from the posterior tip of the pallial line, and the smaller anterior scar of the posterior cruciform muscle scars lying even with and ventrally from the posterior tip

of the pallial line. *Macoma expansa* is plumper than the new species, with an average width of 32% of its length, has a more rounded posterior end, has no antero-dorsal overlapping "wing," has a longer joined section of the pallial line and pallial sinus line, and the position of the cruciform muscle scars tends to be intermediate between *M. dextioptera* and *M. lama* with the posterior tip of the pallial line ending between the anterior cruciform scar and the small anterior section of the posterior cruciform scars.

*Macoma secta* (Conrad, 1837) and *M. yoldiformis* Carpenter, 1864, sometimes show a very slight tendency for the right valve to overlap the left valve at the antero-dorsal margin. This overlap, when present, is smaller, shorter in length, and its maximum development is closer to the beak than it is with *M. dextioptera*.

The species name, derived from the Greek *δεξιός* (dexios) - *πτερά* (ptera) "on the right side - wing", refers to the "winglike" projection of the right antero-dorsal shell margin that overlaps that portion of the left valve. The combined word is spelled *dextioptera* to make it more pronounceable and the word is a noun.

No subgenus is assigned to *Macoma dextioptera*.

#### DISPOSITION OF SPECIMENS

Holotype: CAS 55801 (EK 1058c) California Academy of Sciences, San Francisco, California, U. S. A.

Paratypes: CAS 48843 (EK 1058) California Academy of Sciences, San Francisco, California, U. S. A.

LACM 1786, in type collection (EK 1058a). Los Angeles County Museum of Natural History, Los Angeles, California, U. S. A.

USNM 711116 (EK 1058b), U. S. National Museum, Washington, D. C., U. S. A.

M802 (EK 1058d), Marine Collections, University of Alaska, Fairbanks, Alaska, U. S. A.

EK 1058e, Collection of Rae Baxter, Bethel, Alaska, U. S. A.

Specimens of *Macoma expansa* and *M. lama* used for comparisons have been deposited at the California Academy of Sciences and the U. S. National Museum. These specimens are numbered:

#### Explanation of Figures 1 to 6

Figure 1: *Macoma dextioptera* spec. nov. Holotype, CAS 55801 length 39.2mm (interior, right valve)

Figure 2: *Macoma dextioptera* spec. nov. Holotype, CAS 55801 (interior, left valve)

Figure 3: *Macoma expansa* Carpenter, 1864. CAS 55802, length 43.6mm (interior, right valve)

Figure 4: *Macoma expansa* Carpenter, 1864. CAS 55802 (interior, left valve)

Figure 5: *Macoma lama* Bartsch, 1929. CAS 55806, length 31.3mm (interior, right valve)

Figure 6: *Macoma lama* Bartsch, 1929. CAS 55806 (interior, left valve)



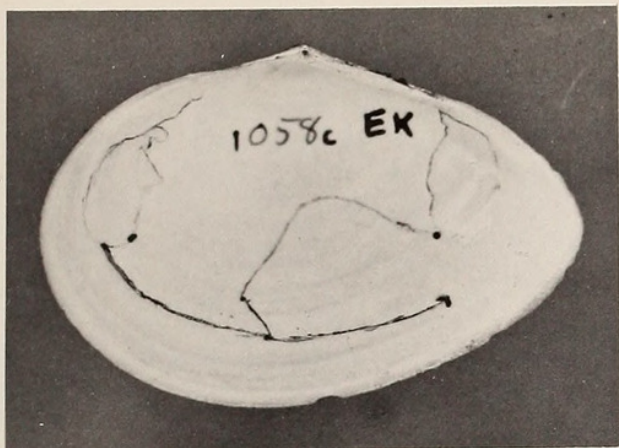


Figure 1

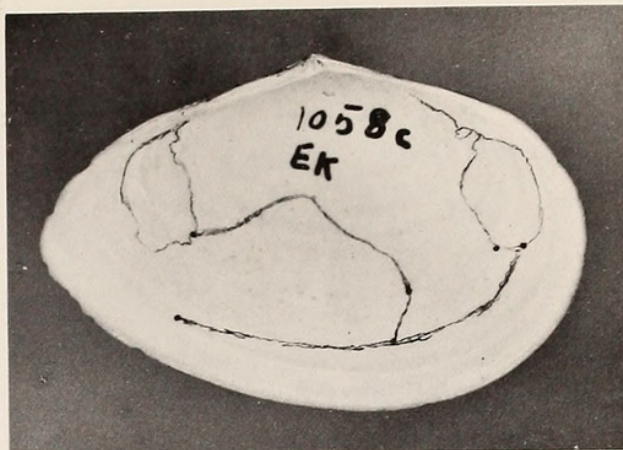


Figure 2

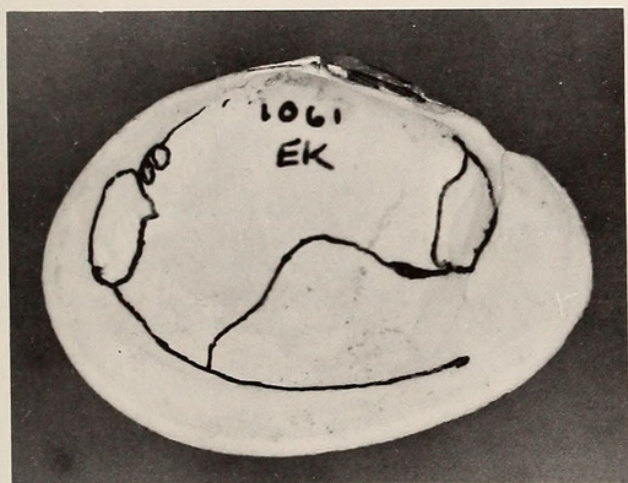


Figure 3

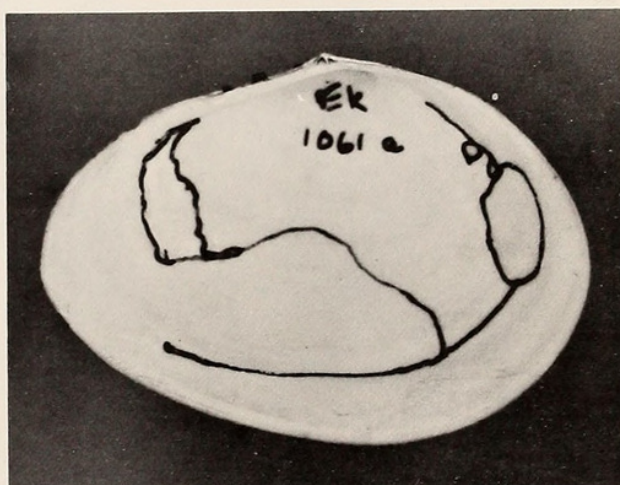


Figure 4

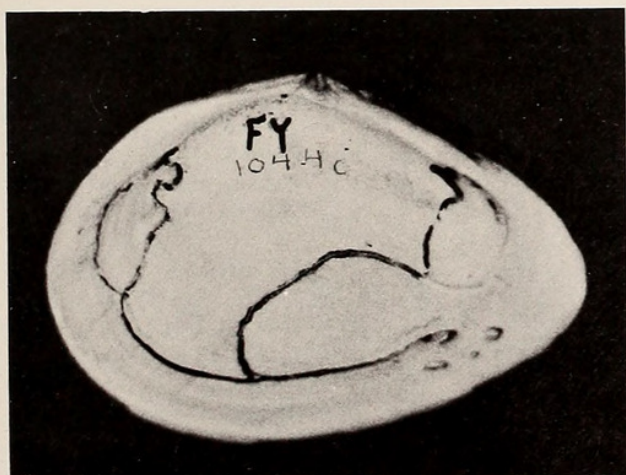


Figure 5

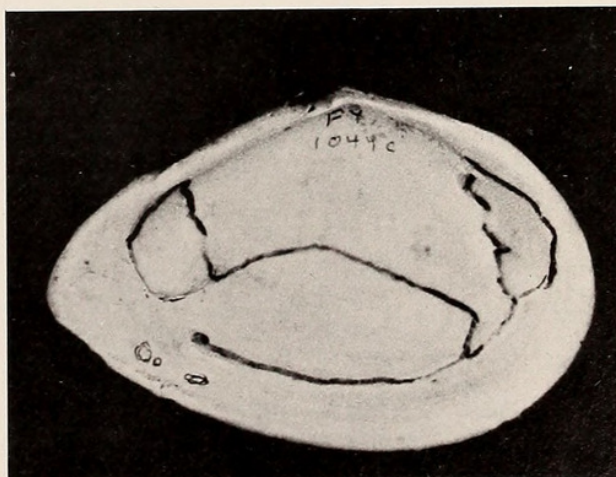


Figure 6







Baxter, Rae. 1977. "A NEW ALASKAN MACOMA MOLLUSCA BIVALVIA." *The veliger* 19, 272-276.

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