

wood leaves near the dry bed of Deer Creek where it enters the valley. Shells collected near Porterville by Hemphill (C. A. S. Nos. 8802-8805, incl.) are identical with those from Deer Creek. Young shells of what appears to be this smaller race (A. G. S. No. 5495) were collected at Bartlett Park on the South Fork of the Tule River, 12 miles East of Porterville.

At the type locality of *rex* two specimens (C. A. S. No. 28121-A) of a much smaller, thin-walled race of *tudiculata* referable to *tularensis* (Hemp.) were found with the large shells. Examples of this were collected also at three other places farther down in the foothills: in the granite hills back of Porterville, north of the main road up the Tule River; one-half mile north of Lindsay in the low hills capped by a jaspery rock from which crysoprase has been mined; and at Bartlett Park (A. G. S. No. 4604).

*H. tudiculata tularensis* (Hemphill) is readily distinguishable from *rex* and *kernensis* in spite of the overlapping of range with the former subspecies and its variants. However, it is a snail of the higher foothills at medium altitudes, where it reaches its maximum development.

The authors are indebted to Dr. Henry A. Pilsbry and to Dr. G. Dallas Hanna for assistance and advice on this brief study of an interesting problem of variation.

Berkeley, California, September 17, 1937.

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## EXTENDED RANGES OF NORTH PACIFIC SHELLS

BY WALTER J. EYERDAM

(Continued from page 104)

*Lora nazanensis* (Dall). Dredged 10 fathoms, shelly bottom, Elrington Island, Prince William Sound, Alaska. Former range: Norton Sound, Alaska, to Aleutian Islands. Extended range: About 700 miles eastward.

*Lora becki* (Moller). Twenty fathoms (not common), stony bottom, Drier Bay, Prince William Sound, Alaska. Former range: Bernard Harbor, Arctic Coast and southward. Extended range: About 600 miles southward.

*Alvania alaskana* (Dall). On stony algae, low tide, 5 specimens. Shuyak Strait, Afognak Island, Alaska. Former range:



Nunivak Island, Bering Sea. Extended range: About 200 miles southward.

*Alvania carpenteri* (Weinkauff) (syn. = *Alvania reticulata* (Cpr.)). On stony algae, low tide mark, Elrington Island, Prince William Sound, Alaska. Former range: Forrester Island, Alaska, to Neah Bay, Wash. Extended range: About 700 miles northward.

*Cingula (Nodulus) kyskensis* (Bartsch). Shuyak Strait, Afognak, Alaska, under stones, between tides, rare, Shuyak Strait, Afognak Island, Alaska. Former range: Kyska and Atka Islands, Alaska. Extended range: About 1400 miles eastward.

*Cingula (Nodulus) cerinellus* (Dall). Under stones, between tides, rare, Shuyak Strait, Afognak Island, Alaska. Former range: Kyska and Amchitka Islands, Alaska. Extended range: About 1440 miles eastward.

*Beringius crebricostatus* (Dall). Low tide to 100 feet depth, rather common in some localities, Izhut Bay, Afognak Island, Alaska. Former range: Plover Bay, Aleutians, eastward to Shumagins. Extended range: About 300 miles eastward.

*Diadora aspera* (Esch.). On rocks at low tide, not common, Izhut Bay, Afognak Island, Alaska. Former range: Cooks Inlet, Alaska, to Magdalena Bay, Lower Calif. Extended range: About 100 miles westward.

*Euspira monterona* (Dall). Dredged 10 fathoms, Brier Bay, Knight Island, Alaska. Former range: Arctic Ocean to Aleutian Islands. Extended range: About 600 miles eastward.

*Mopalia ciliata* (Sowb.). Under rocks, Izhut Bay, Afognak Island, Alaska. Former range: Vancouver Island, B. C., to Lower Calif. Extended range: About 900 miles northwestward.

*Mopalia sinuata* (Cpr.). Dredged 25 fathoms, on stones, Drier Bay, Knight Island, Alaska. Former range: Forrester Island, Alaska, to San Francisco, Calif. Extended range: About 700 miles northward.

*Buccinum angulosum* (Gray). Washed on sandy beach, 1 specimen, Izhut Bay, Afognak Island, Alaska. Former range: Bernard Harbor, Arctic Coast, west to Point Barrow and south as far as Bering Strait. Extended range: About 700 miles southward and eastward.



*Acmaea limatula* (Cpr.). Between tides, on rocks, common, Newport, Oregon. Former range: Crescent City, Calif., to Cerros Island and Socorro Island. Extended range: About 400 miles northward.

*Acmaea scutum cribraria* (Cpr.). Venice, Calif. Former range: Neah Bay, Wash., to Santa Barbara, Calif. Extended range: Southward.

*Acmaea digitalis umbonata* (Reeve). San Pedro, Calif., on the breakwater. Former range: Saginaw Bay, Alaska. Extended range: About 2300 miles southward.

*Acmaea peramabilis* (Dall). Drier Bay, Alaska, Sand Point, Shumagin Islands, Alaska, on granite rocks and stones, very sparingly distributed. Former range: Shumagin Islands, Alaska, on granite rocks only. Extended range: About 600 miles eastward.

*Phytia setifer* (Cpr.). San Pedro Bay, Calif. Former range: Humbolt Bay to San Francisco Bay, Calif. Extended range: Several hundred miles southward.

*Crepidula onyx* Sowerby. Dredged, Sitkalidak Island, also Prince William Sound. Former range: Monterey, Calif., to Panama. Extended range: About 2500 miles northward.

*Thais emarginata projecta* Dall. On cobble stones at low tide, Zenith, Wash. Former range: Sitka, Alaska. Extended range: About 700 miles southward.

*Thais lamellosa hormica* Dall. On reefs at low tide, Port Orchard, Kitsap County, Wash. Former range: Inner Harbor of Sitka. Extended range: About 700 miles southward.

*Buccinum castaneum triplostephanum* Dall. Dredged, Sitkalidak Island, Alaska. Former range: Kyska and Amchitka Islands, Aleutians. Extended range: About 1000 miles eastward.

*Cerithiopsis frazeri* Bartsch. Feeding on sponges. Three Saints' Bay, Kodiak Island, Alaska.

*Turbonilla taylori* Dall and Bartsch. Dredged 15 fathoms, shelly bottom, Sawmill Bay, Prince William Sound, Alaska. Former range: Port Simpson to Vancouver Island, B. C. Extended range: About 900 miles northward.

*Panomys norvegica turgida* Dall. One specimen, sandy beach, Sitkalidak Island, Alaska. Former range: Unalaska to the



Shumagin Islands. Extended range: About 200 miles northeastward.

*Pecten jordani* Arnold. One specimen, dredged, Izhut Bay, Afognak Island, Alaska. Former range: Puget Sound and Strait of Georgia. Extended range: About 1200 miles northwestward.

*Pecten islandicus pugetensis* Oldroyd. Ten fathoms, shelly bottom, Hinchinbrook Island, Alaska (coll. Norberg). Former range: San Juan Island. Extended range: About 1000 miles northward.

*Astarte arctica* Gray. Fifteen fathoms, muddy bottom, Hinchinbrook Island, Alaska (coll. Norberg). Former range: Circumboreal, Bering Sea and Aleutian Islands. Extended range: About 600 miles eastward.

*Macoma yoldiformis* Cpr. Dredged, muddy bottom, Hinchinbrook Island, Alaska (coll. Norberg). Former range: Fuca Strait to San Diego, Calif. Extended range: About 1000 miles northward.

*Macoma quadrans* Dall. Dredged, Hinchinbrook Island, Alaska (coll. I. Norberg). Former range: Boca de Quadra Island, Alaska, south to the Coronado Islands, Calif. Extended range: About 500 miles northward.

*Macoma inquinata arnheimi* Dall. Sandy beach, Unalaska Island, Aleutians. Former range: Kodiak Island, Alaska, and south to San Francisco; also Pleistocene of San Pedro, Calif. Extended range: Westward about 500 miles.

*Colus (Aulacofusus) georgianus* Dall. Dredged, fifteen fathoms, Chichagof Island (coll. I. Norberg). Former range: Strait of Georgia, B. C. Extended range: Northward about 800 miles.

*Chrysodomus vinosus* Dall. Dredged, Gulf of Peter the Great near Vladivostok, Siberia. Former range: Western Bering Sea and Avacha Bay, sixteen fathoms. Extended range: Southward about 1200 miles.

*Liomesus ooides* (Midd.). In beach drift, False Pass, Unimak Island. Former range: Okhotsk Sea, also Pleistocene of Yesso (Hokkaido), Japan. Extended range: About 1500 miles westward.

*Buccinum angulosum transliratum* Dall. In beach drift, Sitkalidak Island, Alaska. Former range: Point Barrow and south-



ward to Bristol Bay. Extended range: Southward about 400 miles.

*Turbonilla eyerdami* Bartsch. Dredged, Hinchinbrook Island, Alaska (coll. Norberg). Former range: Drier Bay, Knight Island, Prince William Sound (*Type locality*).

*Retusa pertenuis* Mighels. On eelgrass roots, Hinchinbrook Island, Alaska (coll. Norberg). Former range: Arctic Ocean, Bering Sea (Krause), also Atlantic Ocean. Extended range: About 1000 miles southward.

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NEW LAND AND FRESHWATER MOLLUSCA FROM  
THE UPPER PLIOCENE OF KANSAS AND A  
NEW SPECIES OF *GYRAULUS* FROM  
EARLY PLEISTOCENE STRATA

BY FRANK C. BAKER

Pliocene Mollusca from freshwater deposits in the middle west are apparently rare. Henderson (Fossil Non-marine Mollusca of North America) does not list a single locality from this region and none has come under the writer's observation. It is with great satisfaction, therefore, that it is now possible to describe a rather large fauna of both land and freshwater species from Meade County, Kansas. The entire fauna will be treated in detail in a later paper. The deposit occurs 90 feet beneath the surface in a clay bed with lenses of sand, the fauna being in the clay. The deposit contained a large vertebrate fauna which will be described in due course of time. The material was collected by Mr. Claude W. Hibbard, Assistant Curator of Vertebrate Paleontology in the Dyche Museum of Natural History of the University of Kansas. Four apparently new species were observed which are diagnosed in this paper. My thanks are due Mr. Hibbard for the opportunity of studying this fauna.

*VERTIGO HIBBARDI* n. sp.—The shell has 5 whorls and is very ventricose over the body whorl. The sutures are impressed, the apex is obtuse and bluntly rounded. There is a conspicuous crest behind the outer lip, behind which are two pits showing the position of the palatal laminae. The body whorl is flattened laterally and the base of the shell is trumpet-shaped when viewed from



Eyerdam, Walter J. 1938. "Extended ranges of north Pacific shells." *The Nautilus* 51, 122–126.

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