

***Protothaca restorationensis* a little known venerid bivalve species from the Pacific Northwest**  
by George P. Holm

*Protothaca restorationensis* Frizzell, 1930 is one of those molluscs that almost borders on being a myth. Few people have ever seen the species and of those who have there is great uncertainty about its validity as a species. Is it a valid species or merely a hybrid of two familial species, *Protothaca staminea* (Conrad, 1837) and *Protothaca tenerrima* (Carpenter, 1857)?

The species was described by Don Frizzell in 1931 from fossil shells which were “fairly common in the Upper Pleistocene deposits on the north side of Restoration Point near Port Blakely, Washington.” “Twenty five species had been collected from the deposits [at the time of the description] and almost all of them were found to be still living on the immediately adjacent beach.”

In his description, Frizzell wrote that the species was “extremely rare living in Puget Sound” (Reported by Professor Trevor Kincaid of the University of Washington). In a subsequent paper the next year he wrote that it was represented by just a single specimen in the Recent fauna. “It was collected by Professor Trevor Kincaid at Little Beef Harbor, near Seabeck, Washington, on Hood Canal, during the autumn of 1928, living above extreme low tide, associated with *Protothaca staminea* and *Protothaca tenerrima*.”

Drew Skinner lived in Port Orchard right on Puget Sound until recently and he would walk the beaches there at low tide looking for shells to use in his many trades with foreign collectors. It was in the 1990's that he found his first *P. restorationensis* which, at the time, he took to be just an odd looking *P. tenerrima*. It was not until he was shown a copy of the paper by Frizzell, that he found out that he had found a recent dead specimen of *P. restorationensis*.



*P. restorationensis* Frizzell, 1930. [90 x 68 mm] Collected in July 1998 where Blackjack Creek empties into Sinclair Inlet, Port Orchard, Kitsap Co., Washington. Size is 90 x 68 mm. Drew V. Skinner Jr. collector.

Specimen in G. P. Holm collection.  
G. Holm photos.

That first specimen was found right in Port Orchard and a second, also dead, was found on a beach close to Annapolis. He has found a total of no more than six specimens over many years of looking, all were recent dead and four of them are in collections of PNWSC members. In addition to myself, the other club members who have a specimen are Tom Rice, Trevor Roberts and David Allison. Drew did not keep a specimen for himself.

Imagine my excitement when DFO biologist Rick Harbo from Nanaimo B.C. told me that his biologist friend, Bill Merilees, had collected *P. restorationensis*, including a live specimen, at Louie Lagoon on Nootka Island, off the west coast of Vancouver Island, in the 1980's, and that he had been to Nootka Island in 2005 and also had found shells of the species there.



*P. restorationensis* Frizzell, 1930 [1 cm grid]. Collected in Mary Basin, Nootka Island, British Columbia in 2005.

Specimens collected and photographed by Rick Harbo.

This past summer I had the pleasure to join Rick Harbo and Bill Merilees on a collecting trip around the small islands off Nanaimo. During my visit with them I had occasion to see Rick Harbo's specimens and also visit with Bill Merilees at his home where I saw the specimen which he had collected alive. Neither of the specimens I saw were as large as my Puget Sound specimen which I had brought along for comparison.

Nootka Island and Restoration Point are far removed from each other with the first situated in Puget Sound opposite Seattle and the other on the Pacific coast almost midway on Vancouver Island.

I am interested in history and am always looking at tie-ins and connections with anything that I research. I observed the following for the two localities and it is of historical rather than of biological interest. In March of 1778, Captain James Cook of the Royal Navy became the first European to set foot on British Columbia soil when he visited Friendly Cove on Nootka Island and in 1792, Captain George Vancouver anchored his ship Discovery off Restoration Point, which he named, while teams from his ship surveyed the lower Puget Sound.

I shall be interested to hear of any other finds of *Protothaca restorationensis*.

References -

Nautilus, vol. 43, pp. 120-121. 1930. A NEW PLEISTOCENE FOSSIL FROM PORT BLAKELY, WASHINGTON by Don L. Frizzell. Transactions of the San Diego Society of Natural History. Volume VI, No. 21, pp. 319-324, plate 22. 1931. A Molluscan Species New To The Recent West Coast Fauna by Don L. Frizzell.

***The Dredgings*, Volume 46 No. 6, 2006, p. 3 - 5.**

**Exciting New Find at Birch Bay**  
 Article by Linda Schroeder. G. P Holm photos.



Fig. 1

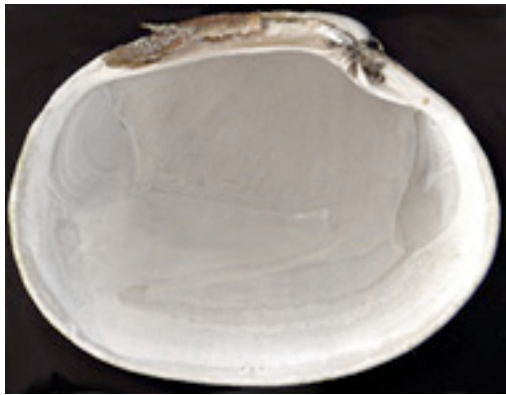


Fig. 2



Fig. 3



Fig. 4

On April 19, 2007 I ventured over to Birch Bay State Park for my first shelling expedition of the season. Shortly after I arrived I made my best find of the day. At first I thought I was seeing a huge *Protothaca staminea* (Conrad, 1837) lying there on the sand. After picking it up I realized it was shaped more like a *Protothaca tenerrima* (Carpenter, 1857). I soon realized I might be looking at the elusive *Protothaca restorationensis* Frizzell, 1930. I hunted high and low for another one but only came up with numerous *P. staminea* and one live *P. tenerrima*.

George Holm wrote a Dredgings article about this shell a couple issues ago (Vol 46, #6). It is uncertain whether *Protothaca restorationensis* is it's own species or a naturally occurring hybrid between *P. staminea* and *P. tenerrima*. Only a handful of specimens have so far been discovered. All were in Puget Sound and at Nootka Island off the west coast of Vancouver Island. I happened to be going to visit George the very next day and was able to compare my specimen to his. They were a match.

I was on the south side of Birch Bay when I discovered my shell, the same location of our field trip of two years ago. Our June field trip to Semi-ah-moo Spit holds new interest now as it is located just around a point of land to the north of Birch Bay. Both *P. staminea* and *P. tenerrima* can be found there. Maybe we can also locate a *P. restorationensis* !

**Figures 1-7.**

**1-2,** *Protothaca restorationensis* Frizzell, 1930, Birch Bay, Whatcom County, Washington. 90 x 68 mm. **3-4,** *Protothaca restorationensis* Frizzell, 1930, Port Orchard, Kitsap County, Washington. 88 x 68 mm.

**5-7,** Magnified sections showing shell sculpture:  
**5,** *Protothaca restorationensis* Frizzell, 1930.  
**6,** *Protothaca tenerrima* (Carpenter, 1857).  
**7,** *Protothaca staminea* (Conrad, 1837).



Fig. 5

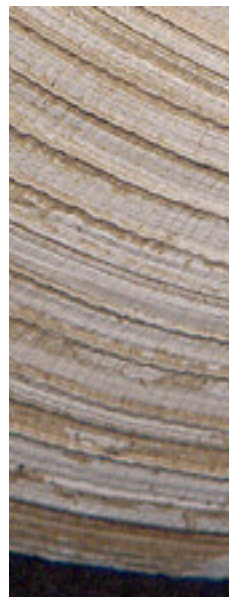


Fig. 6



Fig. 7

## Protothaca restorationensis more common than first thought

Article by George Holm and Linda Schroeder. Photos by Linda Schroeder

The day prior to the club field trip to Bremerton Narrows, George Holm joined Linda Schroeder and Cheryl Roosma during a low tide at Birch Bay. They were eager to check out an area of the bay where Linda had earlier found a specimen of the scarce bivalve, *Protothaca restorationensis* Frizzell, 1930, which she wrote about in the last issue of *The Dredgings*.

That day the find-of-the-day was to belong to Cheryl who found their first live specimen of the species [Fig. 1] which measured 77 mm. Her shout of joy at her find could be heard far about the bay. Later, while showing her prize find to Linda, she found a second specimen which, although it was dead, had both valves intact and was in good condition. George was crossing a sandbar to look at Cheryl's shells when he made a find of his own of a large specimen, but that one had one broken valve and the other valve has a chipped edge. The specimen measured 92 mm and was two millimeters larger than the one which Linda had first found. This was to be the beginning for the two of a friendly rivalry to see which of them could find the bigger specimen. George held the record for only a little over two weeks when a specimen that Linda found, also in Birch Bay, measured 93 mm and so broke his record by one millimeter. Linda has since found a live specimen, and once again in Birch Bay, which measured 106 mm and with that one she will most probably hold on to the record for finding the biggest *P. restorationensis* for some time to come.

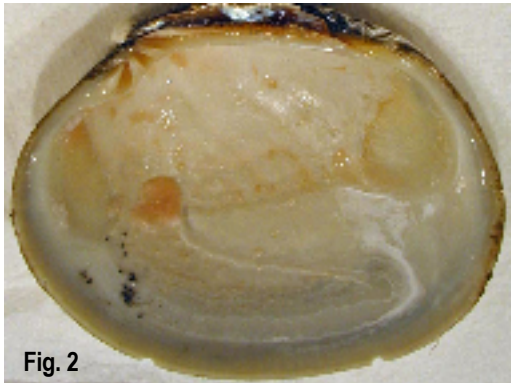


*P. restorationensis* has been a rare find anywhere on the coast prior to this, but now, with the added exposure given to it in *The Dredgings*, other collectors, like Linda, may recognize it when they see it on the beach and it will prove to be a much more common species than previously known. This certainly has been the case at Birch Bay and at Semi-ah-moo Spit in Northwest Washington, where Linda now has found numerous live and dead specimens in both of those locations. The total number found between the two sites up to the first week in July was 78 specimens, 11 of them live. One specimen was so freshly dead that Linda snatched it from some seagulls who were still feeding on it.

Reed Schilbach came for the field trip at the Semi-ah-moo Spit and went home with *P. restorationensis* as part of her find for the day. Club member Alex Sassi who lives in California flew up a couple of days after the Semi-ah-moo field trip. He shelled both at Semi-ah-moo Spit with Linda and at Birch Bay with Linda and George and came away from both beaches with specimens. The three missed each other initially at Birch Bay, but Linda, while circling about and looking for Alex and George, found four live specimens, one of them the 106 mm prize.

While sorting through a box of shells which had been given to the club by Tom Rice, Linda came across two *P. restorationensis*, 84 and 96 mm. Both specimens lacked data, but they most likely came from the Kitsap County area of Puget Sound.

*P. restorationensis* does resemble a young Butter Clam, *Saxidomus gigantea* (Deshayes, 1839) a common species on both the beaches. This similarity may prove to be one reason for why it has been overlooked. When an actual specimen of *P. restorationensis* was found and observed, then all who saw it agreed that it was an easy shell to separate from the other dead clam shells on the beach. *Saxidomus* has a thicker shell and a pronounced, protruding ligament which helps differentiate it from *P. restorationensis*. *Saxidomus* also has a much more oval, thicker pallial sinus than *P. restorationensis*, whose pallial sinus [Fig. 2] is also deep but is narrower and comes to more of a point. Beach-worn *P. tenerrima* (Carpenter, 1857) can also closely resemble *P. restorationensis*, when the concentric ridges have been worn down. However *P. tenerrima* is a thinner shell and it often has a thin, pale gray-brown periostracum on the lower half of the shell which we have never observed on *P. restorationensis*. The umbone on *P. tenerrima* is also more anteriorly pointed. Despite the similarities between these three species, once set aside, there is no doubt as to their identification.

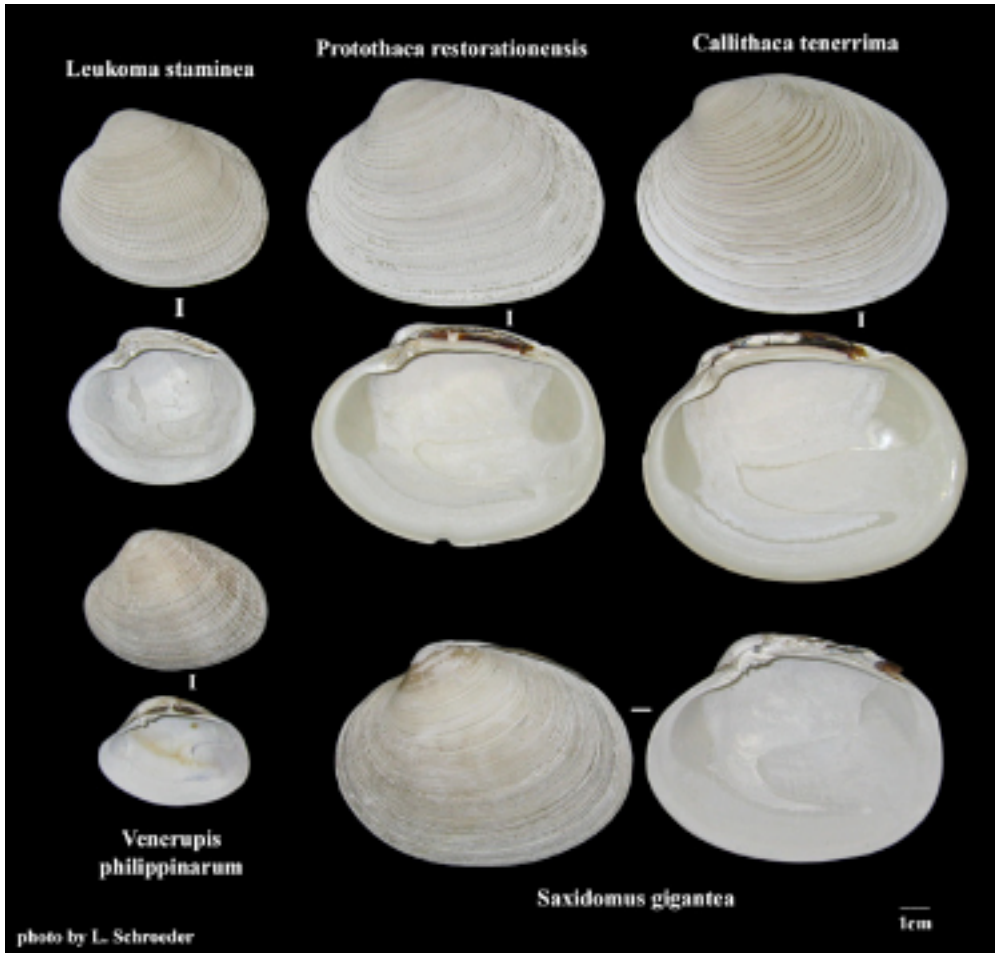


Juvenile *P. restorationensis* are another matter. Their size is the same range as the *Protothaca staminea* (Conrad, 1837) and *Venerupis philippinarum* (A. Adams & Reeve, 1850). Even the general shape of the shell falls within the range of proportions typical of these two cousin species. However *P. restorationensis* has never been observed to exhibit the colorful markings that are sometimes present on *Venerupis* or *P. staminea*. *Venerupis* can also be readily identified by its short, stubby pallial sinus. Separating *P. staminea* and juvenile *P. restorationensis* is a little more difficult. So far only beach-worn juvenile specimens of the *P. restorationensis* have been found, but they seem to indicate that the pallial sinus will be slightly longer in proportion to the overall size of the shell. Also, the teeth on *P. staminea* seem to be a little thicker and more pronounced. (See photo comparison on next page.)

Since *P. restorationensis* is considered to be a possible hybrid of *P. tenerrima* and *P. staminea*, a specimen of each species has been preserved in alcohol for future DNA analysis. This may someday assist in solving the question as to whether *P. restorationensis* is a hybrid or a valid species. Linda is also compiling measurements taken from the shells to help determine if there is any variation which might indicate hybridization. So far there is a slightly wider range of length/height ratios for the *P. restorationensis* than the *P. tenerrima*. However, it seems no more or less varied than our other local Veneridae species. Any overlap in characteristics between the species has only been seen in dead specimens so it's hard to say yet whether there is any true hybridization or whether it's artificial due to weathering on the beach. The live specimens can all be readily identified as a specific species.

If anyone observes *P. restorationensis* during a collecting trip then please pass on the information of its location to Linda or George so that eventually a more detailed understanding of the species distribution can be made. Also, please note if *P. tenerrima* and *P. staminea* are present or absent on the beach. Of interest are also any questionable identifications due to potential hybrid overlap.

Update on the question of our local Veneridae Clams



*Protothaca restorationensis* Frizzell, 1930 is no longer considered to be a hybrid between *Protothaca staminea* (Conrad, 1837) and *Protothaca tenerrima* (Carpenter, 1857). Further study by Eugene V. Coan and Paul Valentich Scott (*Lights and Smith Manual*, 2007) have now placed *staminea* in the genus *Leukoma* whereas *tenerrima* is now *Callithaca tenerrima*. This alone tends to remove the hybrid question from play. An initial DNA test conducted for us by the biology division of the USGS suggests that *restorationensis* is not closely related to *staminea* but is instead very close to *tenerrima*. For the present *restorationensis* is placed in the genus *Leukoma* as *Leukoma restorationensis* (Frizzell, 1930), however, we believe that its true standing still needs further study and that this is not the end of the story for *restorationensis*.

Photos

Above

Comparison of the *Veneridae* clams commonly found in the Pacific Northwest.

Right

Comparison of a large adult *L. staminea* with juvenile samples of *P. restorationensis* and *C. tenerrima*. A typical adult *staminea* averages 55-65mm. On the same beach, a typical adult *restorationensis* averages 75-90mm and *tenerrima* averages 85-100mm. The largest *staminea* rarely exceeds 70mm, while *restorationensis* can exceed 100mm and *tenerrima*, 110mm.

