

Freshwater Natural Pearls from the Concho River, Texas

Natural pearls have been found in many species of freshwater mollusks in North American lakes and rivers throughout history. They are most abundant within the Mississippi River drainage area, which provides the perfect habitat for these animals because of the large watershed areas with their underlying limestone substrata (James L. Sweaney and John R. Latendresse, "Freshwater pearls of North America", Fall 1984 *G&G*, pp. 125-140). Lesser known sources of natural freshwater pearls are the Colorado River and Brazos River and their tributaries in the State of Texas. However, the best samples are sometimes found in a species named Tampico Pearlymussel (*Cyrtonaias tampicoensis*) that inhabits the Concho River in Western Texas.

The mollusk is distributed from northeastern Mexico into the Colorado and Brazos Rivers of central Texas, and they have been collected by licensed harvesters. Mussel-harvesting is restricted to hand collection only and there is a legal minimum shell size requirement. In addition, several areas in Texas have been designated mussel sanctuaries in order to provide protection and species conservation (Robert G. Howells, "The Tampico Pearlymussel (*Cyrtonaias tampicoensis*), Shades of the Old West", http://www.conchologistsofamerica.org/articles/y1996/9606_howell.asp). Pearlers find mussels by walking in three to four feet of water and feeling for the shells with their toes. The presence of rattlesnakes on the banks, as well as water moccasins and snapping turtles in the murky water (John Morthland, "Irregular radiance, The rare beauty of Conch River pearls", *Texas Highways*, April 2015) show the risks these adventurers take in their quest for these gems.

Recently GIA's New York laboratory received nine loose pearls, from Stone Group Laboratories, ranging in size from 2.95 x 2.45 mm to 14.76 x 13.55 x 13.13 mm for a joint study. These pearls were reportedly recovered from Tampico Pearlymussel shells taken from the Concho River and exhibit colors ranging from purplish pink to orangy pink. Some of the samples also possess differing degrees of a brownish hue (figure 1). The majority of the small pearls in the group exhibited a chalky dull appearance, with some areas of the nacreous surface being broken or cracked. However, the largest pearl in the group (16.59 ct) showed good nacre condition, a high luster, and noticeable orient on its surface.



Figure 1. Nine “Concho” pearls examined in this study together with a Tampico Pearlymussel shell donated to GIA by Bear Williams of Stone Group Laboratories. The shell measures approximately 12 x 8 cm. Photo by Sood Oil (Judy) Chia.

The internal structures of the pearls were analyzed by real-time microradiography, and the majority revealed typical concentric natural growth arcs (figure 2). Dark organic-rich centers were also seen in some of the pearls, as well as internal fissures, cracks, or growth boundaries. There were no indications of bead nuclei or non-bead cultured features (irregular linear or void structures) in these pearls. Additional advanced techniques such as X-ray fluorescence imaging and energy-dispersive X-ray fluorescence (EDXRF) spectrometry confirmed their freshwater nature. Furthermore, Raman spectroscopic analysis detected polyenic – a natural polyacetylenic pigment responsible for the colors of many freshwater pearls and some saltwater pearls (figure 3) - peaks in all the pearls.

This study provided GIA with a rare opportunity to study this unique group of freshwater natural pearls originating from the southwestern part of the United States. Both gemological and advanced data agreed with their claimed natural and freshwater origin. Pearls produced from this locality often possess beautiful fancy pink, purple or lavender colors, as was reported previously (Gems News, Summer 1989, G&G and Lab Notes, Fall 2005, G&G) as well as shown by these examples.

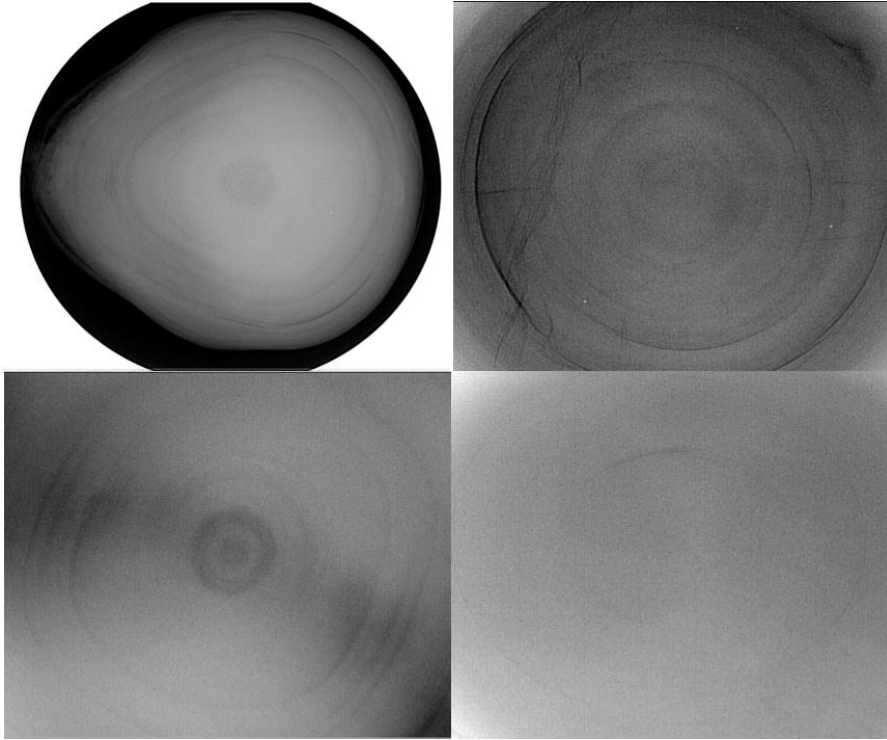


Figure 2. The internal structures of the pearls showed typical natural concentric growth arcs, while some also exhibited dark organic-rich centers.

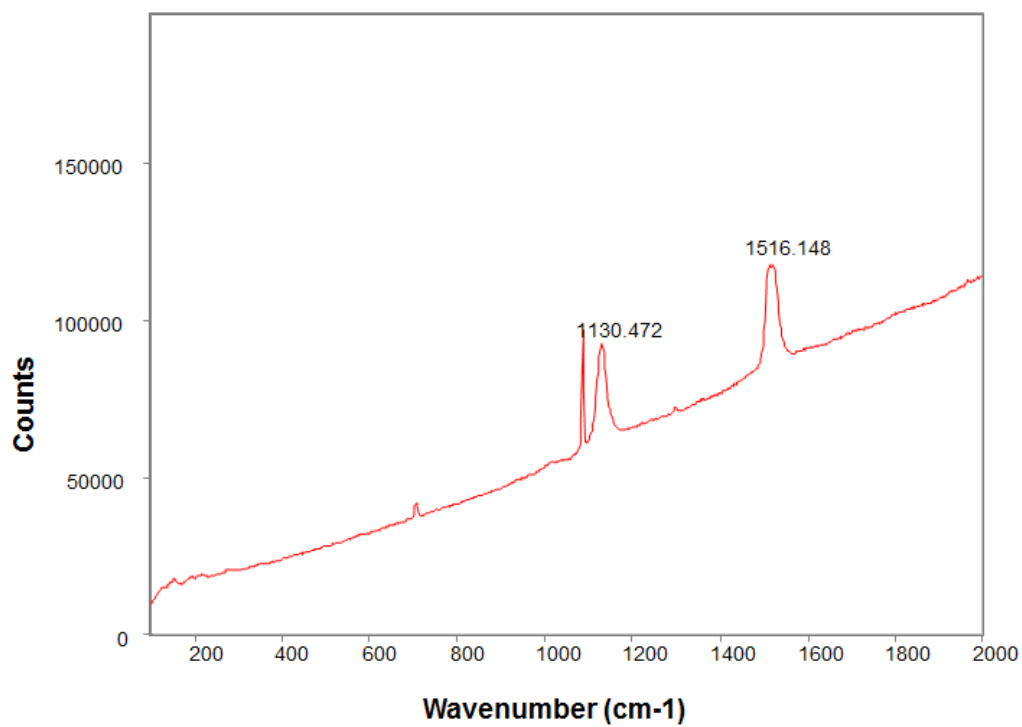


Figure 3. Raman spectrum of a “Concho” pearl showing polyacetylenic pigment-related peaks at 1130 and 1516 cm^{-1} and peaks at 1086, 704, 701 cm^{-1} (latter two a doublet) of structural calcium carbonate in the form of aragonite.

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