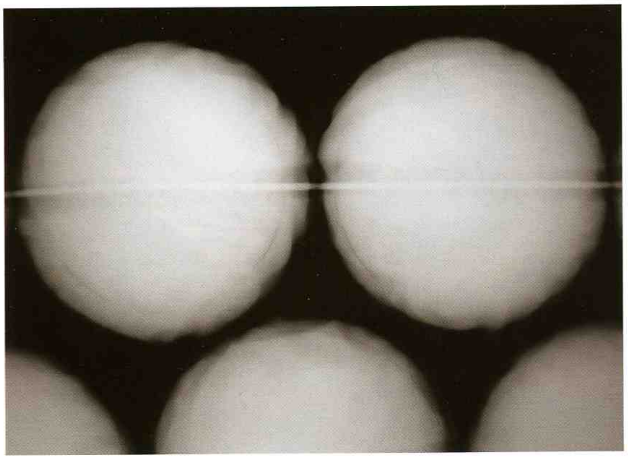


Figure 26. X-radiography revealed nacre thicknesses of only 0.3–0.6 mm in some of the engraved cultured pearls. Image by S. Singbamroong, © Dubai Gemstone Laboratory.

for an identification report. A traditional Islamic rosary, the strand consisted of 33 engraved round pearls (11–14 mm in diameter), two button-shaped pearls used as separators, and an engraved drop-shaped pearl for joining the strand. The cultured pearls had gray, brown, and black bodycolors with overtones varying from rosé to green.

On closer visual examination, the cultured pearls showed a glassy appearance (figure 24). When examined with magnification and reflected light, it was evident that they had been coated with a transparent, colorless substance (figure 25, left), possibly to improve the durability and apparent luster. Some of those with thin nacre showed small fissures and areas in the engraved patterns where the white bead nucleus was exposed (figure 25, right).

The cultured pearls were inert to long- and short-wave UV radiation. X-radiography revealed that the nacre varied from 0.3 to 1.3 mm thick, with a few having nacre in the 0.3–0.6 mm range (figure 26). UV-Vis reflectance spectra consistently revealed absorption maxima at 700 nm, which is characteristic of natural-color black cultured pearls from the *Pinctada margaritifera* oyster. EDXRF analysis also confirmed the absence of manganese and metals such as silver, proving the pearls were of saltwater origin and natural color.

According to Umit Koruturk, the design was drawn on the cultured pearls' surface before the hand-engraving work, which utilized special tools and a unique method that requires an experienced fashioner. The fashioner can engrave from 3 to 10 pearls per day. The company has reserved about 9,000 cultured pearls for this engraving process, mainly consisting of South Sea (Indonesian) material in nearly the entire range of bodycolors and overtones. As of mid-June 2008, approximately 2,000 cultured pearls had been engraved by this technique.

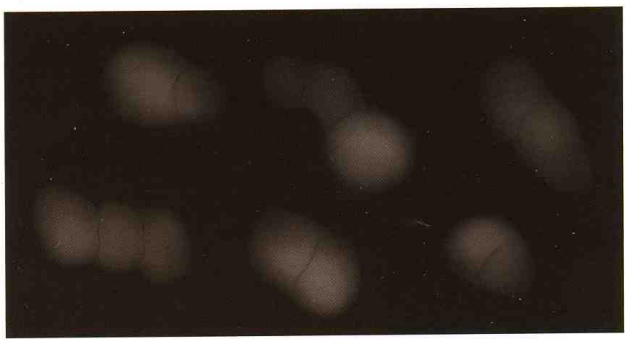
Sutas Singbamroong (sssutas@dm.gov.ae)
and Ayesha Rashid Ahmed
Dubai Gemstone Laboratory
Dubai, United Arab Emirates

***Pinctada maxima* cultured pearls grown beadless in the mantle.** Several lots of oddly shaped silvery white pearls (see, e.g., figure 27) arrived at the SSEF laboratory in March 2008. They were rather flat on one side, with the largest being 19 mm long. Many appeared to be intergrown, and the multiple structures were clearly visible with X-radiography (figure 28). The appearance and growth structure were strongly reminiscent of some beadless freshwater cultured pearls from China. Natural saltwater pearls only very rarely contain two centers and commonly display a more complex growth pattern.

When considering the various methods for culturing pearls, we can postulate a few options for these samples. Both freshwater (e.g., *Hyriopsis, Anadonta, Cristaria*) and saltwater (e.g., *P. maxima, P. margaritifera*) mollusks can be used as hosts for pearl culturing. Growth can be stimulated with a piece of mantle tissue grafted into either the gonad or the mantle. In addition, the tissue piece can be implanted with or without a bead. Thus far, a number of

Figure 27. The five white beadless cultured pearls shown here (up to 19 mm long) were likely mantle grown in a P. maxima *oyster. A pink Chinese freshwater cultured pearl is shown for comparison. Photo by H. A. Hänni, © SSEF.*

Figure 28. X-radiography of the cultured pearls in figure 27 shows their composite nature with multiple centers. The dark lines mark the intergrowths. Image by H. A. Hänni, © SSEF.



combinations have been seen: Freshwater mussel + mantle grown + beadless = a Japanese Biwa cultured pearl or the classic Chinese freshwater cultured pearl. Saltwater oyster + gonad grown + bead = a product such as Akoya or South Sea cultured pearls. Less well known are South Sea "keshi" cultured pearls (saltwater oyster + gonad grown + beadless; see H. A. Hänni, "A short review of the use of 'keshi' as a term to describe pearls," *Journal of Gemmology*, Vol. 30, 2006, pp. 51–58). A more recent development consists of freshwater mussels with coin-shaped beads (freshwater mussel + mantle grown + bead; see D. Fiske and J. Shepherd, "Continuity and change in Chinese freshwater pearl culture," Summer 2007 *Gems & Gemology*, pp. 138–145).

The cultured pearls we examined appeared to be a new variation: saltwater oyster + mantle grown + beadless. These samples (again, see figure 27) showed all the characteristics of a product that was the result of tissue grafted into the mantle of *P. maxima*. It is possible that the host oysters were used for culturing two types of pearl at the same time: beaded, gonad-grown cultured pearls and these beadless mantle-grown products. That the baroque-shaped cultured pearls contained multiple centers joined into a single body reminded us of similar-appearing Chinese freshwater cultured pearls reported in the GNI entry that follows in this issue. As with the "twin" cultured pearl described in that entry, the samples documented here may have resulted from the mantle pieces being placed too close to one another, or the cultured pearls were left in their host mollusks for too long a period of time.

The trade has typically referred to beadless cultured pearls from *P. maxima* and *P. margaritifera* as "keshi." We expect that these new products will appear under this name on the market. While South Sea and Tahitian keshis so far have consisted of gonad-grown cultured pearls formed after bead rejection, the pearls described here are obviously mantle grown, as indicated by their flattened base which suggests formation close to the shell.

Henry A. Hänni

Twinned cultured pearl. The SSEF laboratory is seeing an increasing number of natural pearls for examination. The majority show the typical features of saltwater natural pearls: diagnostic X-ray structures and the absence of Mn as a trace element. The identification of freshwater natural pearls is more challenging because they typically lack beads, so their shape and growth structures are usually the only characteristics that offer clues for identification. LA-ICP-MS is still not a routine technique, and research and chemical sampling are in progress.

In February 2008, we received an unusual 5.61 ct "twinned" pearl (i.e., two intergrown pearls) for identification. Unlike most such pearls, though, the two parts of the intergrowth were different colors (figure 29). There was also a broken surface on one side that suggested that a third pearl was once attached to the other two. X-radiography in two perpendicular directions (figure 30) showed clear evidence that this was a beadless cultured pearl, with two typically shaped central cavities. Analysis of the Mn

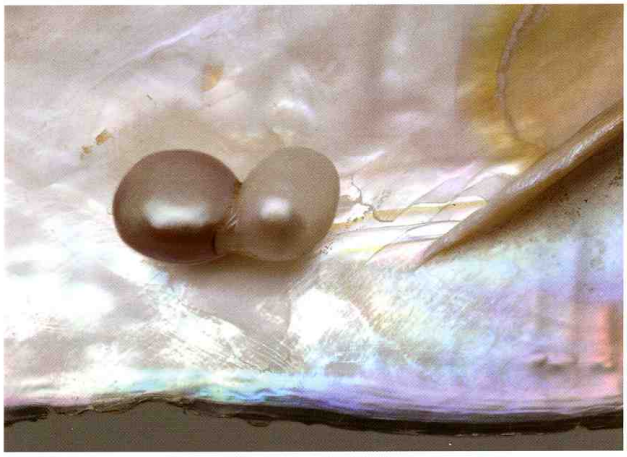


Figure 29. This bicolored freshwater cultured pearl (15 × 8 × 6 mm) is actually an intergrowth of two pearls that were undoubtedly stimulated by tissue pieces taken from different areas of the mantle of the donor mollusk. They are shown on the shell of Hyriopsis cumingii, *the most common source of mantle tissue for freshwater pearls cultured in China. The surface of the shell illustrates the variety of nacre colors that can be produced by the mantle tissue. Photo by H. A. Hänni, © SSEF.*

Figure 30. X-radiographs of the twinned pearl show features typical of beadless cultured pearls, especially the characteristic complex-shaped central cavity. Image by H. A. Hänni, © SSEF.