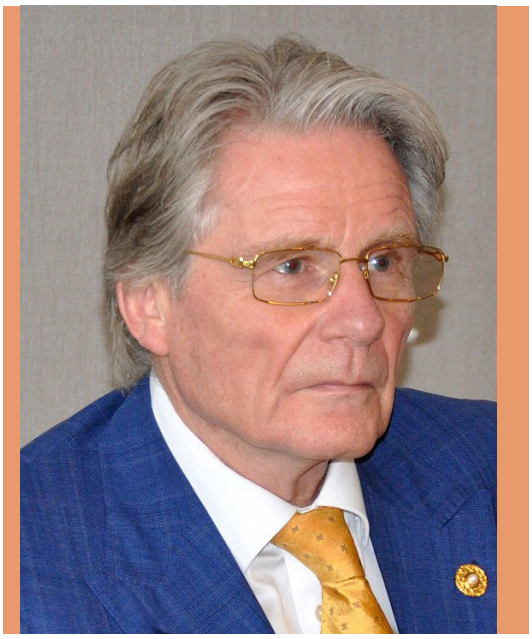
Environmental issues challenge pearl industry, but create opportunities as well

By Kenneth Scarratt, President
CIBJO Pearl Commission

This year's report to some extent continues the trend and focus set forth in the 2018 Pearl Commission Report – Protecting the Oceans and Seas. The points of view expressed by members of the commission vary to some extent in terms of focus, but all expressions received are in agreement with the need to be protective of the environments that provide us all with the great bounties that we are so privileged to enjoy.

On the trading front, challenges in the cultured pearl arena continue, as was revealed by the report from the Philippines.

But challenges create opportunities. A relatively small



Kenneth Scarratt, President of the CIBJO Pearl Commission.

supply of natural pearls continues to be available from Arabian Gulf and Australian waters for the specialised market.

The few laboratories around the world that specialise in pearl research and identification continue to evaluate technology and techniques that further enhance the information they can convey to the industry and the end users.

NATURAL PEARLS SECONDARY PRODUCT OF FOOD INDUSTRY

Douglas McLaurin-Moreno, M.Sc., a co-founder of Perlas del Mar de Cortez in Mexico, has expressed an interesting viewpoint that, to some extent, is linked to species-specific issues related to the Queen conch (Strombus gigas), which were were discussed during the 18th meeting of the Convention on International Trade in Endangered Species of Wild Fauna and Flora Conference of the Parties (CITES CoP18).

Mr. McLaurin-Moreno, who has a master's degree in Natural Resources & Conservation Management, writes "as you are all very well aware, I own a sustainable pearl farm, so natural pearls are definitively not something that much concerns me. Yet, it does. I am not a neophyte in the subject, so I will give you a quick insight into my thoughts on this matter and we could begin thinking of finding a way to solve this issue with natural pearls."

Recently, he wrote, he gave presentations on all the different kinds of pearls – both natural and cultured in Mexico, including abalone, conchs, clams, snails and nacreous pearls. "I also explained the actual source of these pearls as not being active pearl fisheries, but actually seafood fisheries. Natural pearl collection is done nowadays only as a by-product of the meat fishery. I wholeheartedly believe this is the case in Mexico and very likely in most places. If CITES and other entities are really worried about the conservation of our threatened natural resources, they should look to ban the shellfish fisheries and try not to impact the natural pearl industry. This is the reality of the 'new natural pearls.' Pearls are not the motor behind the disappearance of key mollusk species," Mr. McLaurin-Moreno noted.

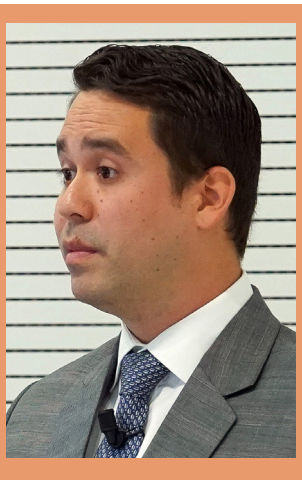
Pearls are not expressly mentioned at any point in the species-specific CITES CoP18 Doc. 85, looking at the Queen conch, where the focus is on the meat from the animal. However, pearls and the shell from the Queen conch are mentioned in the Regional Conch Fisheries Management and Conservation Plan (http://www.fao.org/3/a-i7818e.pdf).

It specifically states: "White conch meat is the principle product in the Queen conch fishery, followed by Queen conch shell and pearls. More recently, the trade of Queen

Olivier Segura, Vice President of the CIBJO Pearl Commission.

Peter Bracher, Vice President of the CIBJO Pearl Commission.

Shigeru Akamatsu, Vice President of the CIBJO Pearl Commission.



Jacques Christophe Branellec, Vice President of the CIBJO Pearl Commission.

An apertural view of an adult shell of the Queen conch (Strombus gigas, now known as Lobatus gigas), from the Caribbean Island of Trinidad and Tobago. (Photo: Wikipedia Commons)

conch opercula has taken off (e.g. exported from Jamaica and Nicaragua)."

The CITES Regional Queen Conch Fisheries Management and Conservation Plan has been endorsed by all the relevant states, but the organisation's secretariat believes that has been only limited progress in terms of its implementation. The secretariat believes that it is important for this work to continue and for the CoP to monitor its progress.

Given the volume of Queen conch pearls on display at recent trade shows and their general popularity, it is important to note the CITES restrictions and management plans for this important species. This is because, as Mr. McLaurin-Moreno has indicated, it seems that the pearls are in fact often a by-product of the conch meat market.

However, Mr. McLaurin-Moreno assertions may really be limited to the Caribbean environment. Natural pearls continue to be fished in Australian and South East Asian waters in general, and they continue to be found around Bahrain.

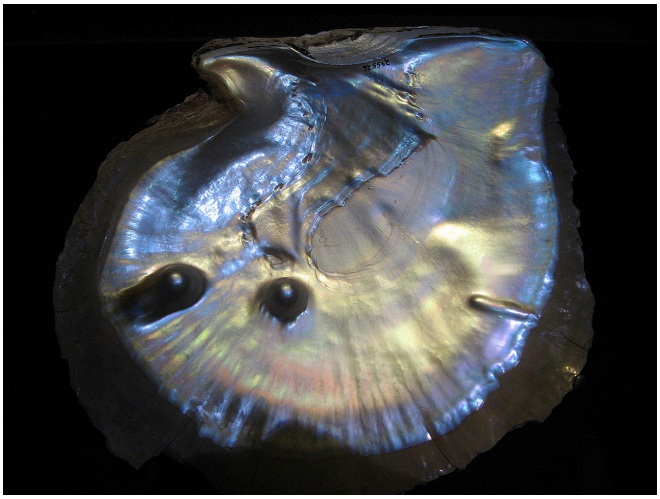
AUSTRALIAN INDUSTRY CERTIFIED AS SUSTAINABLE CHOICE

The Paspaley Pearling Company has reported that the Australian pearling industry has been independently certified as "the world's most ethical and environmentally sustainable choice" by the independent Marine Stewardship Council (MSC).

MSC is an international non-profit organization that recognises and rewards efforts to protect oceans and safeguard seafood supplies for the future. Its stated vision is that future generations will able to enjoy seafood and oceans full of life.

"The MSC Standard is the global gold standard," said Mr. Irving, Executive Officer of the Pearl Producers Association. "The standard is an independent, internationally accredited science-based standard, against which the environmental sustainability management of a wild marine resource fishery is rigorously assessed."

Western Australia's pearl oyster fishery has been in commercial production for 150 years and is the only wild fishery of its type in the world. Paspaley is one of the few companies still diving for wild Pinctada maxima pearl oysters, nurturing the shell on a remote network of farms stretching more than 1,000 kilometres across the north-west coast of Australia. Although logistically complex, this is an environmentally friendly and sustainable form of commercial fishing that causes no damage to the seabed and produces no wasteful by-catch.



A Pinctada maxima shell with pearls (Photo: Wikipedia Commons)

"Environmental responsibility has always been important to Paspaley," stated Peter Bracher, Executive Director of Paspaley Pearling Company. "The preservation of the marine habitat of Australia's wild pearl oysters is essential to our operations. We are very pleased that following a comprehensive two-year assessment, our environmental credentials in this area have been recognised and endorsed by the Marine Stewardship Council. This certification provides an internationally recognised third-party assurance that our pearl, mother of pearl and pearl meat are produced to the environmental standards that are increasingly expected around the world."

The MSC eco-label can be applied to all pearls produced from wild caught pearl oysters, as well as mother-of-pearl and pearl shell meat.

Drift diving for wild shell. Photo courtesy of Paspaley Pearling Company.

PEARL-SPECIFIC FISHING CONTINUES IN BAHRAIN

An exception to the natural pearls as a by-product of food production rule set out earlier by McLaurin-Moreno, is Pinctada radiata, which found in the waters off Bahrain. These are primarily fished for the pearls they may hold rather than for any food potential (which would be very small).

Indeed, the waters around Bahrain have been producing natural pearls for some 4,000 years and continue to do so to this day, in a variety of sizes, shapes, and colours.

Lately a number of relatively large pearls have been fished from these waters, igniting an even greater interest in these ancient pearling areas.

There are no pearl-culturing operations within Bharani waters.

A pearl recently found dangling within a natural pearl sac from the upper mantle of a Gulf Pearl Oyster (Pinctada radiata) weighing 8.36 carats and measuring 11.17 x 10.73 x 9.63mm.

A pearl recently found within a natural pearl sac from the lower mantle of a Gulf Pearl Oyster (Pinctada radiata) weighing 18.07 carats and measuring 13.93 x 13.62mm.

A selection of cultured saltwater pearls with bead from P. radiata cultured off Abu Dhabi ranging from 4.85 mm to 8.50 mm. Photo: Hasan Abdula, DANAT.

PEARLS BEING CULTURED IN PINCTADA RADIATA IN UAE

Both the Ras Al Khaimah (RAK) and Abu Dhabi emirates have producing cultured pearl farms. The former has been in operation for several years longer and has a tourism and educational focus. Both farms use Pinctada radiata as the host mollusc for bead culturing.

Abeer Alalawi of DANAT examined 123 samples of saltwater cultured pearls, said to have been harvested from the farm in Abu Dhabi, and reported on them at the recently held International Gemmological Conference. They displayed a range of colours from white to cream to brownish-cream to yellow to grey and to dark grey, some of them with pink overtones, and came in various shapes such as round, near-round, near-button, near-oval, near-drop, near-baroque and baroque.

While the owners reported that all samples were cultivated within Pinctada radiata they supplied very limited additional information on the process. This bivalve is rarely used for cultivation, as most saltwater pearls are cultivated within the bivalves P. fucata, P. maxima, P. margaritifera, and less commonly within bivalves from Pteria sp. On the other hand, most natural pearls found in the Arabian Gulf are fished from Pinctada radiata.

Nonetheless, a consequence of both sets of production from the UAE now being made available to the market is that one should no longer automatically assume that a pearl's Pinctada radiata origin determines that it is natural.

EFFECT OF PEARL PROMOTION LAW IN JAPAN

The Pearl Promotion Law passed by the Japanese parliament in 2016 has led to the establishment of a dedicated council, reports Shigeru Akamatsu, Vice President of the CIBJO Pearl Commission.

The new council will promote the following:

1. Sustainable production of mother oysters and pearls.
2. Improvement of productivity and quality of the pearls.
3. Conservation of the pearl farm environment.
4. Establishment of the new pearl standard based on the law.
5. Research and technological development.
6. Development of human resources.

The promotion of a "pearl jewellery culture" is a key part of the 2016 statute. Pearls have been considered precious objects in Japan for more than 1,000 years, and the nation's traditional central role in the industry was greatly enhanced with the introduction of pearl culturing. With this history in mind, the new council is planning to educate the public about the pearl and its legacy in Japan.

ENVIRONMENT IMPACTING PHILIPPINE'S PRODUCTION

Climate and environmental changes have had a significant effect on cultured pearl production in the Philippines, reports Jewelmer, the country's leading pearl producer. These relate to greater fluctuations in water temperature, ocean acidification, and the changing of the plankton profile being seen in the local environment. It has affected the survival rate of certain batches of oysters, as well as the overall growth rate, so adjustments need to be made to earlier forecasts.

In light of these factors, the company expect a fall in the

Harvesting saturated gold coloured pearls at a Jewelmer pearl farm in the Philippines. Photo courtesy of Jewelmer.

Philippine's production of cultured pearls over the coming year.

These changes present both challenges and opportunities. Obviously the main challenge is the lower volume of production that will be available for distribution to the global market. On the other hand this also serves as an opportunity because, with the lower biomass density, comes the potential to achieve a higher quality output. This coincides with Jewelmer's strategy, which is to seek out clients that appreciate increased levels of quality and rarity.

Jewelmer reports that consumer demand for its deep-saturation gold colour cultured pearls remains higher than the company's production capacity at present. Locally, competition is stable, but it notes that its performance is being impacted where the Jewelmer harvest competes with what is being produced in Myanmar, although the volume and quality of the latter's production has been volatile.

Concurrently, Jewelmer notes, it has seen an increase in the production of light-yellow coloured goods, mainly from Myanmar, and there appears to be glut of such goods as a result of overproduction, and also because of the distribution strategies being employed.

FROM THE LABORATORIES

Characterisation of Natural Pearls

DANAT, Bahrain Institute for Pearls and Gemstones, will unveil its newly developed system for characterising natural pearls during the Pearl Symposium that will be held on November 14 and 15, prior to the 2019 CIBJO Congress.

The system has been developed to describe natural untreated pearls from the Pinctada radiata complex only. It describes the shape, surface, lustre, body colour, overtone, orient and various matching scenarios.

DANAT's system for characterising natural pearls will be presented the Pearl Symposium in Bahrain that precedes the CIBJO Congress on November 14 and 15, 2019.

DNA analyses of pearls – host mollusc identification

As CITES-related trading restrictions become an increasingly relevant factor in the international and local trade, the ability to trace pearls back to their host molluscs and potentially even geographic origins provides for greater commercial transparency. Additionally, and quite possibly more fascinating, such research can provide information on the sources and trade routes of historic items.

Both the laboratories of DANAT and the Swiss Gemmological Institute SSEF have focused some research efforts on the DNA species identification of a number biogenic materials, and in particular pearls. Species identification services are already being offered or will be offered as client services in the next few months.

DANAT has been collaborating with the University of Naples Federico II in Italy, and in particular with Professor Di Cosmo, to refine collection skill techniques and obtain DNA data that will enable the identification of the host mollusc for individual pearls. SSEF has been similarly collaborating with a number of other European Institutes.

Trace elements and other analyses of natural pearls – host mollusc identification

In addition to it pearl DNA research, DANAT been collecting a vast array of trace elements, high-quality optical data and high-resolution internal structural images of pearls from all nacreous molluscs, with a view to developing alternatives or complimentary techniques to DNA analysis. In each case the host mollusc of the pearl being studied is known.

In particular, trace element analyses carried out using Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) has proven exceptionally useful, as this methodology tends to overcome the impact of bleaching that is so often applied to nacreous pearls.

The Gemological Institute of America (GIA) has also been investigating trace elements present in natural and cultured pearls, publishing it findings for freshwater natural and cultured pearls in *Gems & Gemology*. In the article, the authors state "…we propose that the combination of trace element information provided by LA-ICP-MS and subsequent application of LDA has the potential to classify freshwater pearls from different sources with relatively reliable accuracy."

Age dating of pearls – confirming a pearl's historic status

The Swiss Gemmological Institute SSEF, in partnership with the Ion Beam Physics Laboratory at ETH Zurich, has introduced the age dating of pearls using carbon-14 (^{14}C) as an additional service for clients.

Age determination can support evidence of historic provenance in the case of antique jewellery and iconic natural pearls. It can also be used to identify fraud in cases where, for example, younger pearls are mounted in historical jewellery items, or have been treated so that they appear older than having been recently farmed.

^{14}C age dating can also be used to obtain evidence to support a decision whether a pearl is of natural or cultured formation.

Thus far, the oldest natural pearls examined by SSEF using this method were recovered in the famous Cirebon shipwreck off Java in Indonesia. They were dated to the 11th century AD.

Early in 2019 SSEF announced that it had successfully age-dated the historic "Ana Maria Pearl" using ^{14}C as being from between the 16th and mid-17th century AD. This was the first time such a procedure had been conducted on an historic natural pearl.

X-Ray imaging

Over the last three years we have witnessed increasingly significant advances in the quality of real-time digital X-ray imaging and X-ray computed microtomography (micro-CT) being used for pearl identification. Such breakthroughs have improved the understanding of pearl growth scenarios.

Studies on alternative or complimentary techniques continue. One notable example involves the simultaneous x-radiography, phase-contrast and darkfield Imaging that was reported on by the Swiss Gemmological Institute SSEF in 2017. This was done with the aim of better understanding the internal structures of pearls, and will prove valuable in pearl testing.

With the separation of natural from cultured pearls being based on mainly on an interpretation of their internal structures, it is essential that laboratories involved in the examination of such materials continually look for and experiment with new technologies.

PHOTO CREDITS

Cover photo montage photo of sea by
Alexandra Koch on Pixabay.