Organic Gems

Organic gems

- Probably among the first used
- Pearls need no cutting or polish to bring out their beauty
- Corals are colorful and may have washed ashore
- Amber is lower in specific gravity than sea water and floated ashore
- Ivory and teeth were carved and worn

Pearls

- Pearls were once more valuable than diamonds. But today cultured pearls have taken over the market to such an extent that natural pearls are almost unheard of and not as desirable.

- Natural pearls were mostly from oyster, but some freshwater clam and mussels also make excellent pearls

Pearls (cont…)

- Many of the world's pearls came from the Persian Gulf, but today none are harvested. Pollution from oil, etc. has decimated the oyster beds.
- Pollution has even threatened the cultured pearl market, and Japan that originally dominated the market has lost out because of industrialization and pollution.

Pearls (cont…)

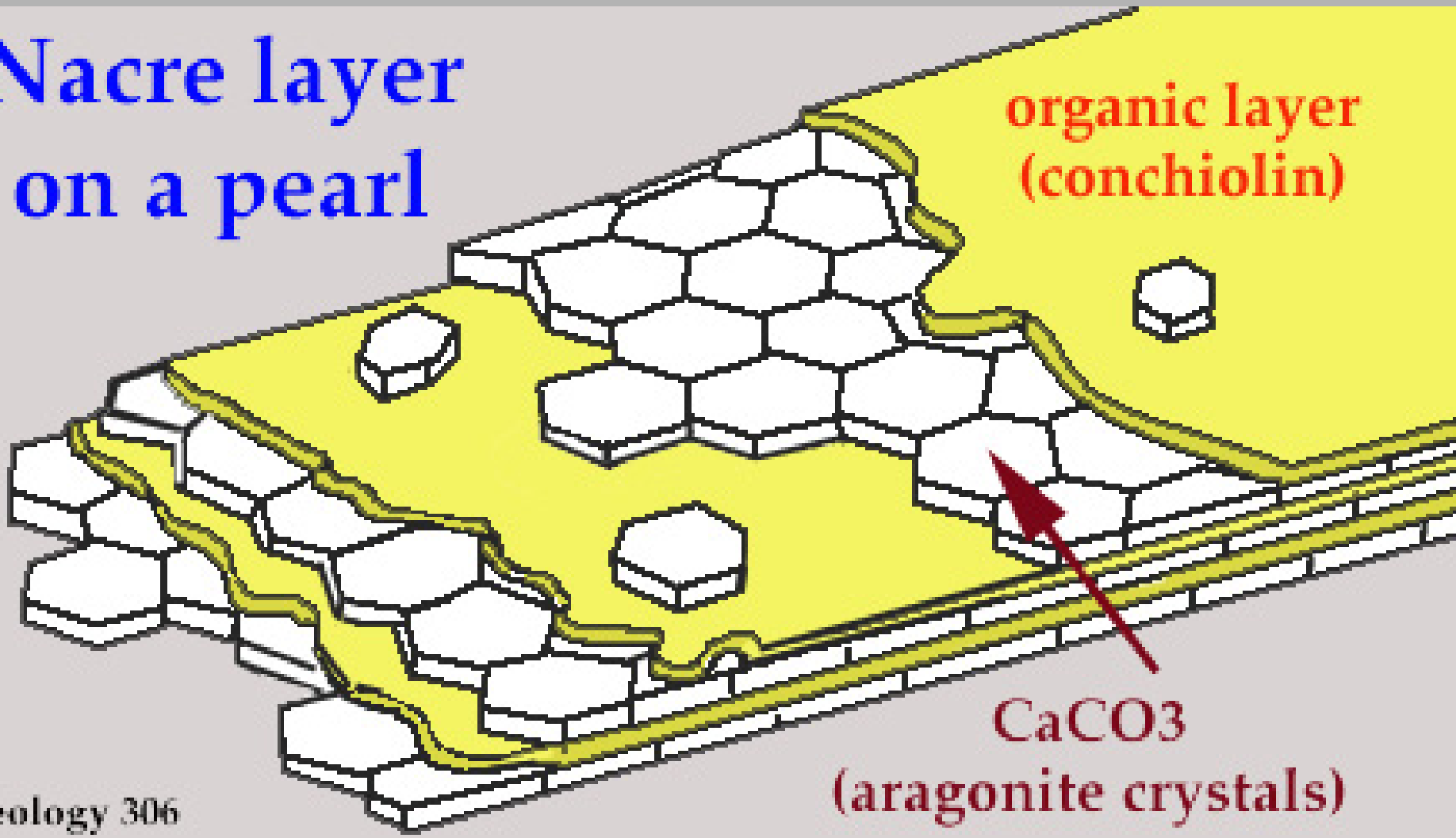
- Today the majority of pearls come from China and are sold at bargain prices, but many are first exported to Japan for processing and may get named made in Japan.

- Very large and often black pearls come from the South Seas, Tahiti, Australia, etc.

Pearls are made of nacre

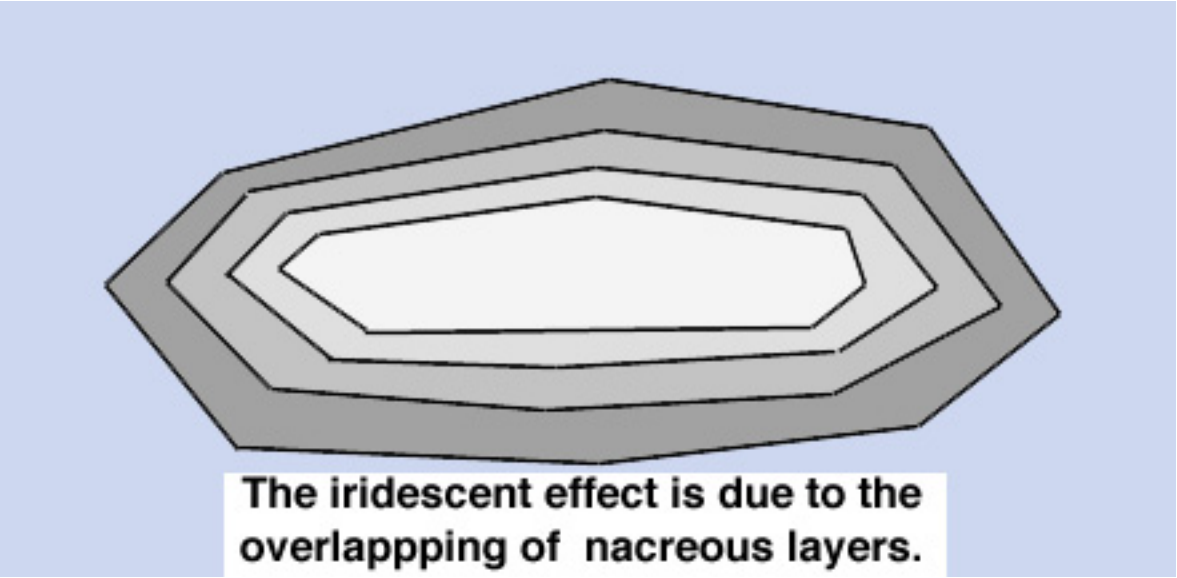
- Nacre is made of layers of the organic substance **Conchiolin** and **Aragonite** a form of calcium carbonate. In a pearl nacre is concentric.
- Because the pearl is created by a Bivalve (clam, oyster,) or snail (Conch), it is not a true mineral. Calcium carbonate is the same substance that occurs inorganically in cave stalactite, etc.

Nacre layer on a pearl



Pearl orient

- The iridescence of the pearl results from a series of nacre layers. The iridescence is called '**orient**' and is created by overlapping nacreous plates or layers.



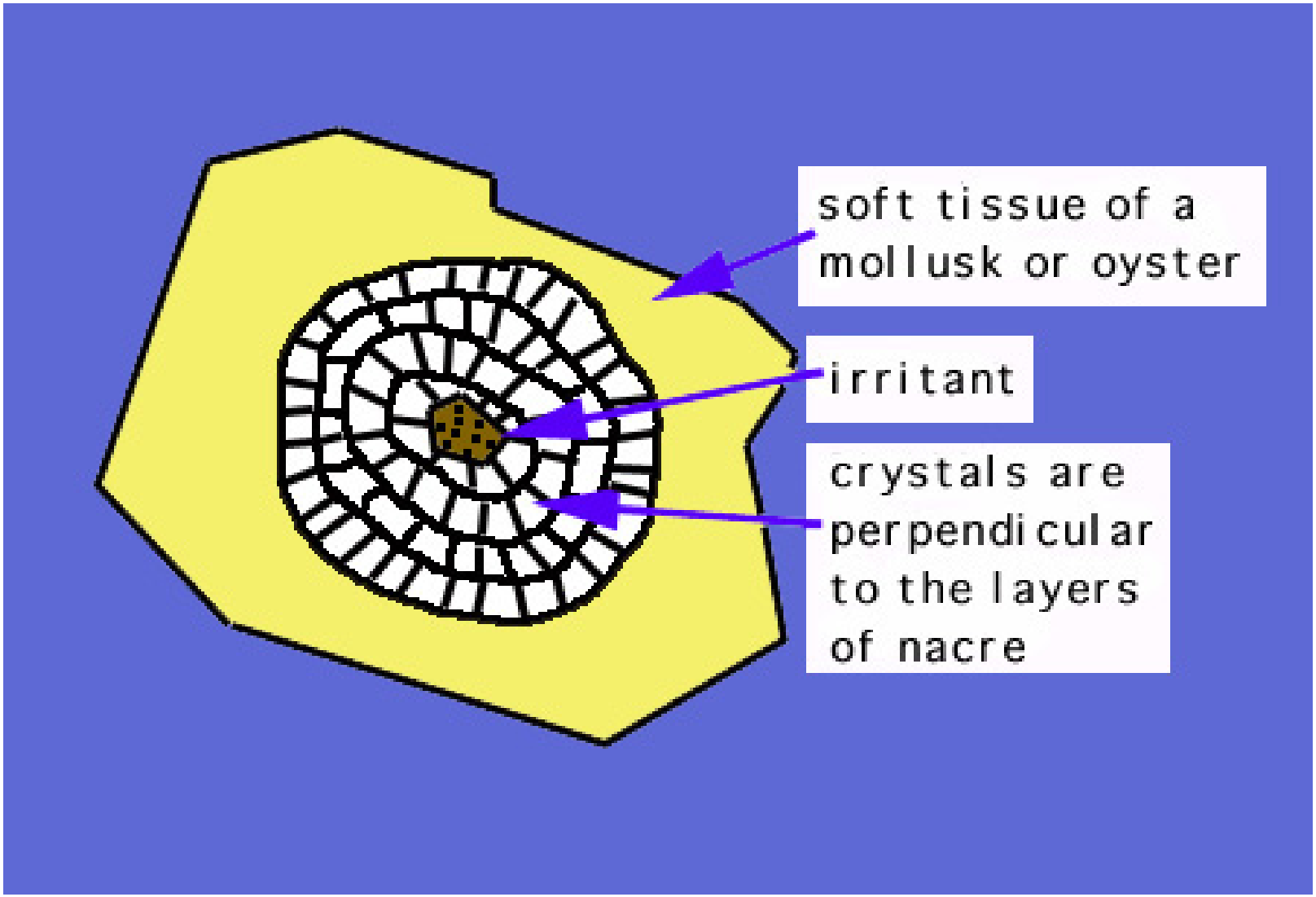
The iridescent effect is due to the overlappping of nacreous layers.

Nacre is mother-of-pearl found inside of shells. This shell has a natural blister pearl.

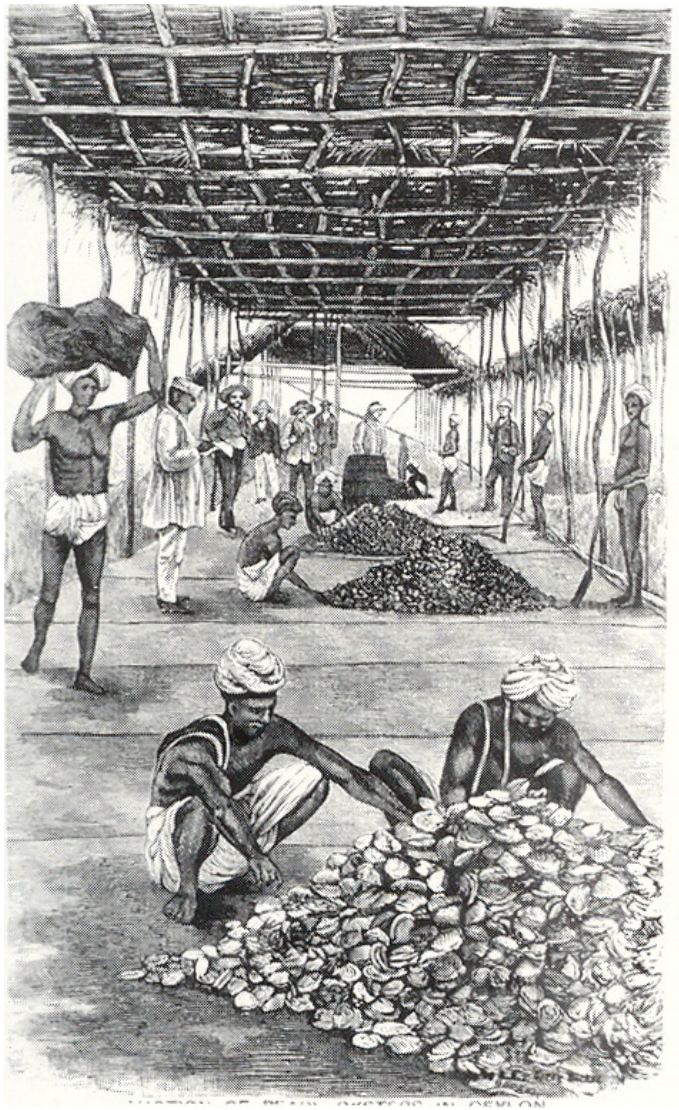
Saltwater pearls include natural and cultured

- Natural pearls have no nucleus and form when a parasite or other problem irritates the mantle (shell producing part) of a clam or oyster causing it to secrete nacre. Blister pearls are stuck to the shell.
- Cultured pearls were developed in Japan. The process of using nucleus was first developed by Tatsuhei Mise (1900), later Tokichi Nishikawa developed the “piece” method that inserts a piece of tissue and a round nucleus or bead of clam shell.
- Kokichi Mikimoto’s “whole wrap” method is not used because Mishikawa’s works better.

Natural pearl

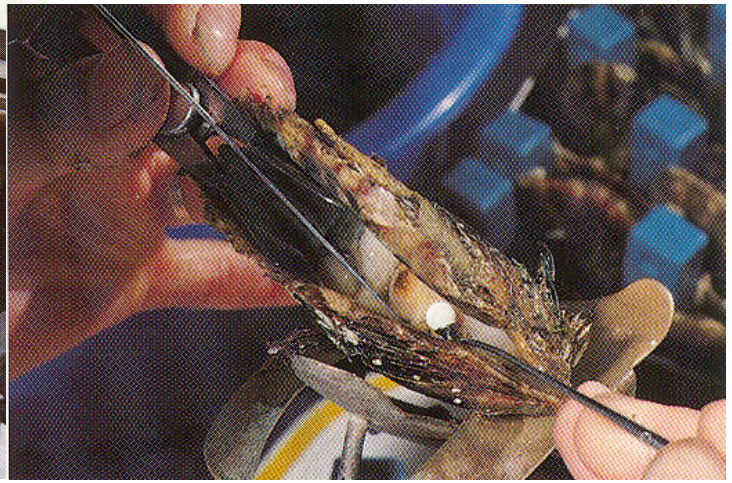


Natural pearls are very rare



Bead implantation in cultured pearls

- Placing a nucleus in an oyster



Nuclei for implantation


TOKYO PETRI SCHALE

Cultured pearls

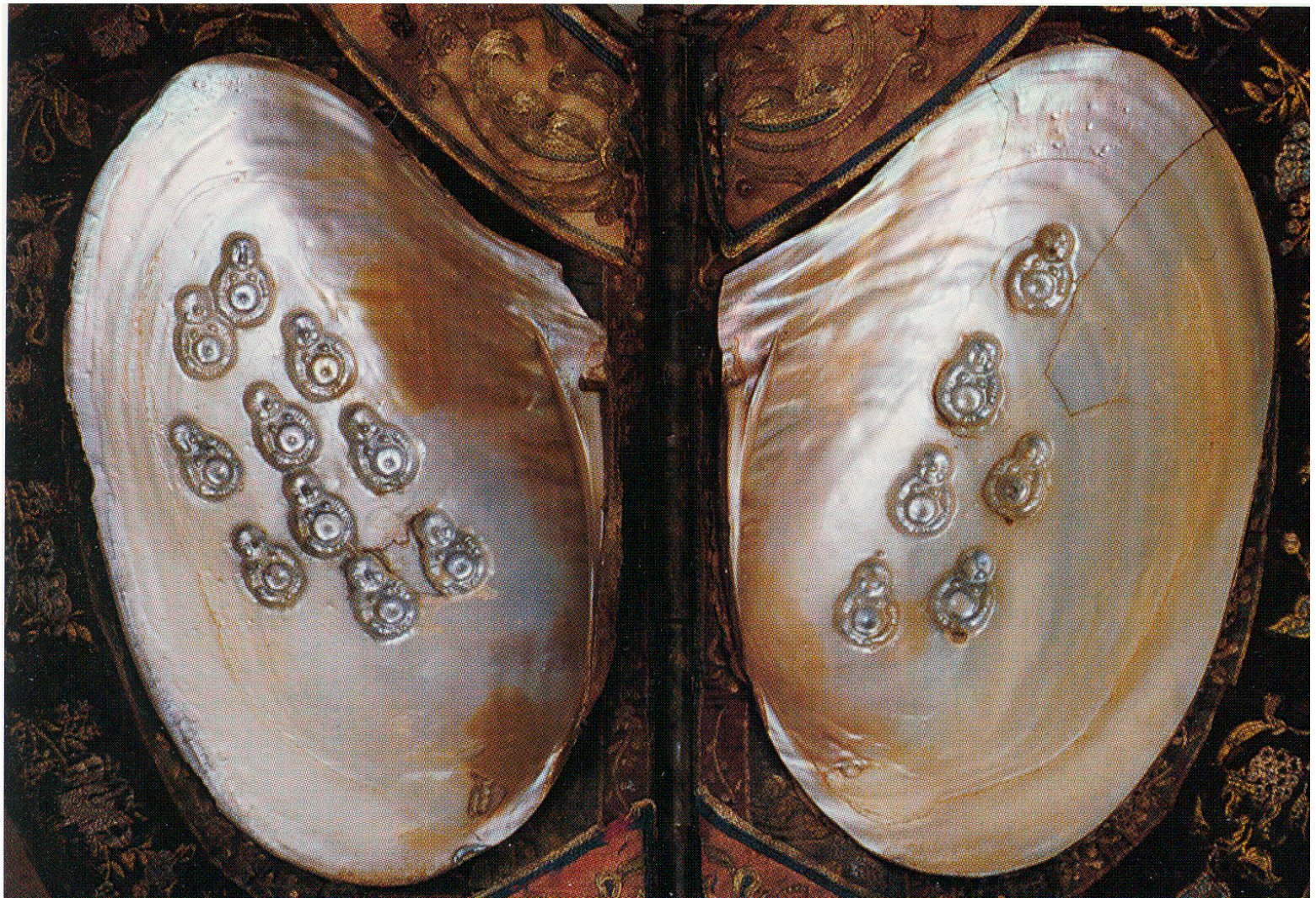
- Mabe pearls are cultured blister pearls. These are produced by inserting a hemisphere of mineral steatite on the shell of the mollusk. A layer of nacre is deposited over the bead. After growth the dome is cut out and cemented onto a mother of pearl bed.
- Akoya pearls are named for Japanese Akoya oyster and use a bead nucleus. The bead is made from American freshwater mussel shells.

Types of freshwater cultured pearls

- Mabe pearls are cultured blister pearls. These are produced by inserting something (a bead or even a budda) onto the mollusk's shell. A layer of nacre is deposited over the bead. After growth the dome is cut out and cemented onto a mother of pearl bed.

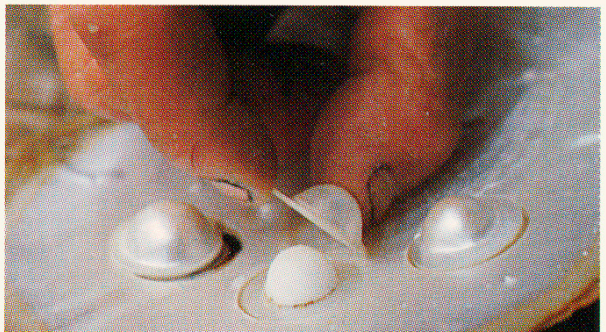
- Biwa pearls were originally produced using freshwater clams at lake Biwa, Japan. They do not have a nucleus, instead piece of living clam mantle tissue is cut from one clam and inserted into another clam. This stimulated pearl formation. Being un-nucleated, they are pure nacre.

Mabe pearls are actuallymother-of-pearl dome- the Chinese invented this method in the 1100s

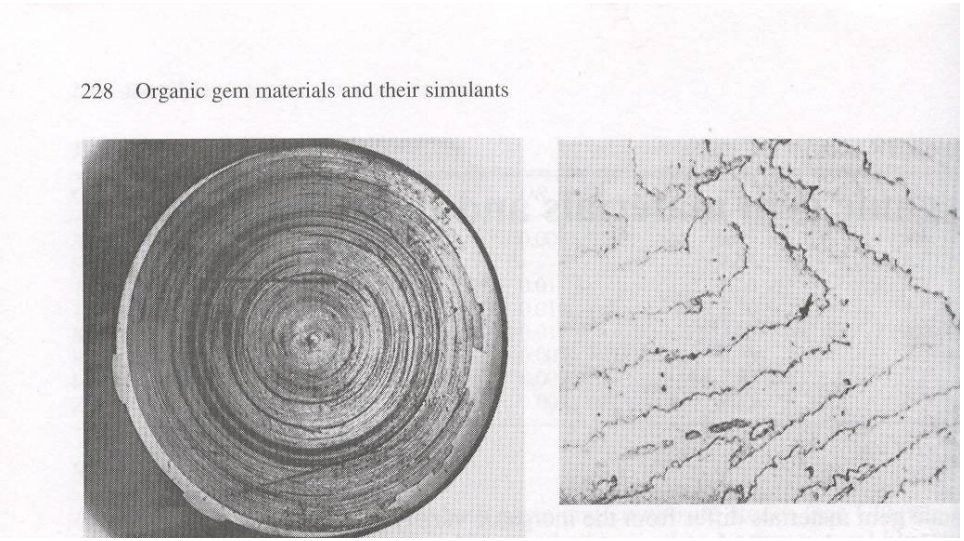


Mabe (cont…)

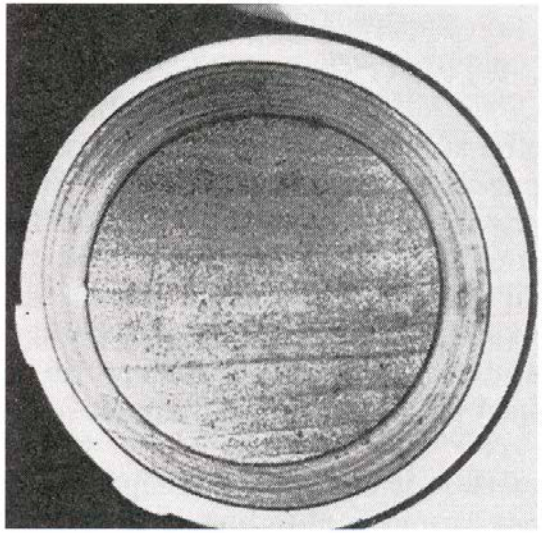
Mabe pearl
Plastic
inserts
removed



Akoya—nucleated saltwater pearls

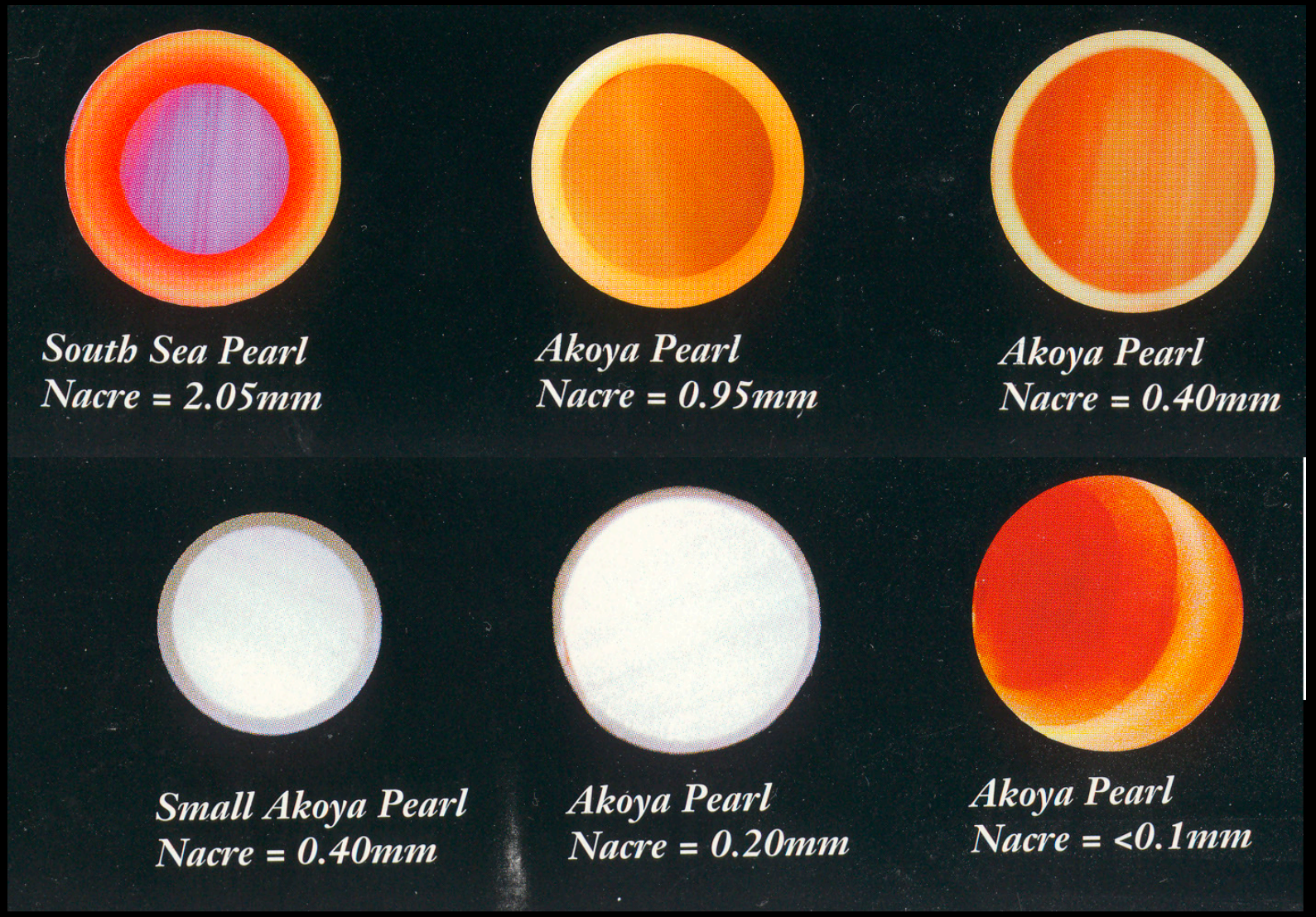


- 1) a natural pearl with no nucleus and a micrograph of nacre layers



- 2) a nucleated pearl. Notice that the nucleus is not concentric only the new growth of nacre on the outside

In nucleated pearls the nacre thickness is critical to the value



Nacre thickness is proportional to growth time

- Originally Akoyas were grown for 3 years now they are done in as little as 6 months
- Thicker nacre will last a few lifetimes. Thinner, cheaper nacre layers will rub off in a few years.
- Pearls are delicate, soft and easily scratched. Too thin a nacre layer means no durability.

Luster

- Though related to nacre thickness, luster is an important criterion for grading pearls.

Shape

- Various shapes besides round exist. Generally round is most valuable

Color

- Some colors are due to dyes. Most white pearls are bleached.

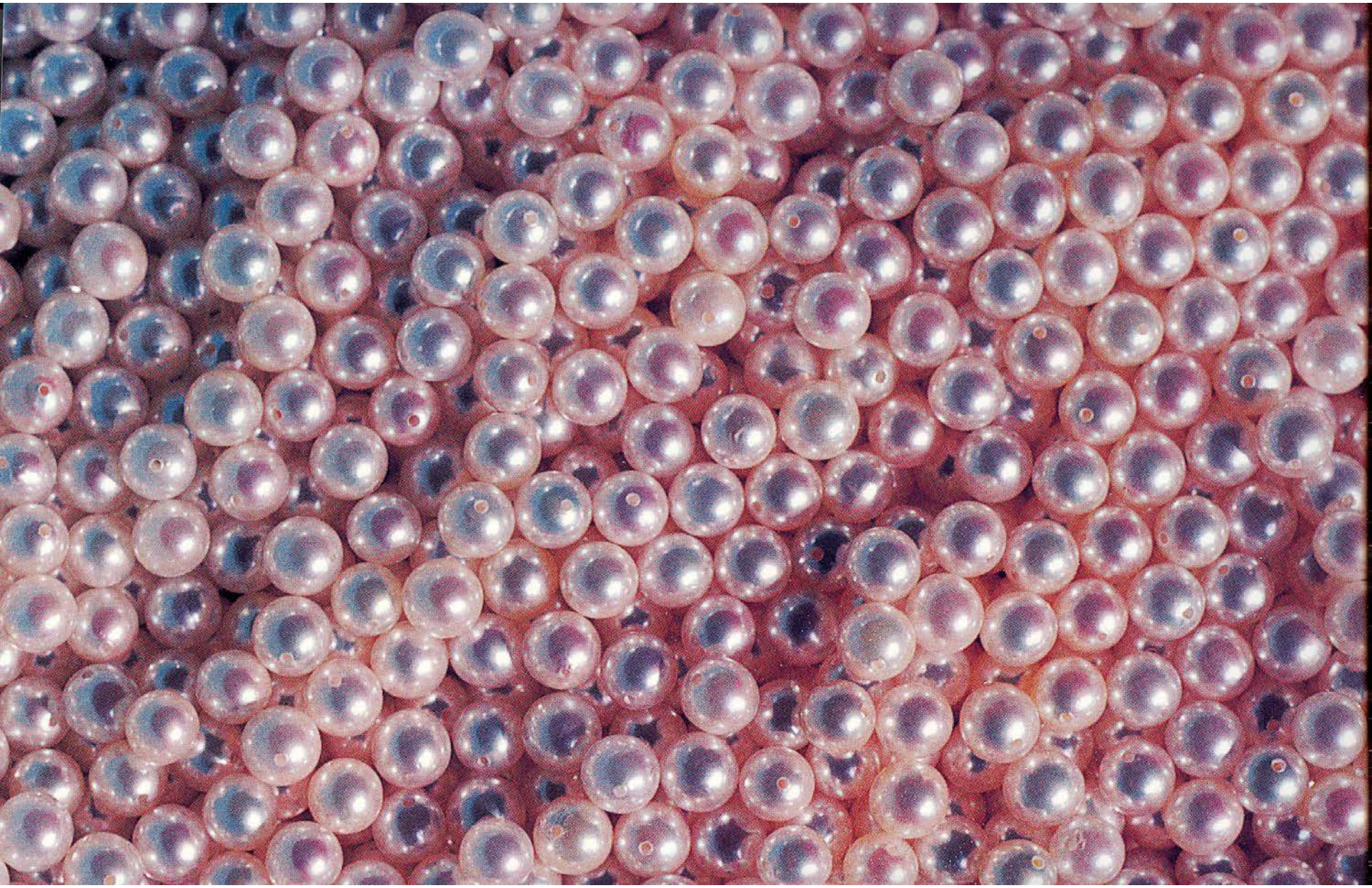
Bleaching pearls

Pearls surface character is important

- Blemishes reduce the luster

Baroque pearls are odd shapes, elongated in one direction

- The Canning Jewel Merman. A large baroque pear makes the torso



Amber

- Amber is fossil tree sap from a pine or other cone bearing tree in the conifer family.
- Tree sap is sticky and can trap insects and other objects.
- Some is very transparent and some is translucent to opaque

Mosquito in Amber

Translucent Amber

Coral

- Red coral (precious coral) is most desired
- Coral is made of calcium carbonate ($CaCO_3$) or horn-like organic material
- Black coral is horn-like material
- Coral is used in beds and carved

Coral is endangered

- Ecologically it is damaging to harvest coral
- Coral is illegal to transport to many countries because of it’s endangered status
- Coral are marine animals and coral reefs are ecologically diverse like rainforests

Coral is soft and opaque

- Coral is soft, 3 on Mohs scale
- Coral is opaque hence color and luster are its main properties
- It is used in beads, cabochons, and carved.

Black coral