

VI. PRECIOUS CORAL.

A small spray of true precious coral (*Corallium* sp.) was found on the beach of the Gulf of Davao, Mindanao, directly in front of the small station called Vigas. This specimen resembled very closely a species of Japanese precious coral (*C. japonicum* Kishinouye).

As it is not improbable that considerable quantities of precious coral eventually may be discovered in the Islands, it seems worth while to give a short description of this article of commerce, and to describe the methods employed in coral fisheries.

DESCRIPTION OF PRECIOUS CORAL.

The precious coral of commerce in its natural state closely resembles a small shrub, or the branch of a tree from which the leaves have been removed. Each stem and twig of this coral shrub has a hard central axis, or skeleton. Outside of this and similar to the bark on a plant is the thin soft covering or skin, which is easily rubbed off when fresh and is friable when dry. There are numerous small holes in the "skin" through which minute, flower-like animals project when the coral is alive; these are the coral animals (zoöids); each of them has 8 small arms or tentacles around its mouth, with which it gathers food. All of these zoöids are connected by a vascular system inside of the skin.

The hard part or skeleton is the valuable portion of the coral. It is made up of fused spicules consisting of carbonate of calcium with a small amount of silica and magnesia. The structure is concentric with radiating lines. The entire skeleton is very hard and so compact that no pores can be seen in a cross-section without the aid of a lens. This furnishes an easy test for distinguishing the precious coral from the numerous varieties of no value.

In color these corals range from white or delicate pink to dark red. Precious corals reproduce sexually, and by budding. The reproductive organs are internal and attached to the faces of the mesenteries; they shed their contents within the body where fertilization takes place. The precious corals are believed to be viviparous. Colonies are sometimes composed entirely of males, sometimes entirely of females, frequently all on one branch are males, while all on another branch of the same colony are females. Occasionally both sexes are combined in one animal, forming a hermaphrodite. The eggs contain a considerable amount of yolk and when hatched the larval forms are free swimming and may move a fair distance before they settle and become fixed.

The food of the precious corals consists of living organisms; they have been known to eat the powdered flesh of fishes.

VARIETIES AND DISTRIBUTION OF PRECIOUS CORALS.

The best known species of precious coral is *Corallium nobilis* Pallas, more generally known under its synonym of *C. rubrum* Linn. This species is found in the Mediterranean Sea off the northern coast of Africa, also off the coast of

Tunis, Sardinia, Italy, Corsica, and at the Cape Verde Islands. Eight species of precious coral have been described from Japan. These are *Corallium japonicum* Kishinouye, *C. elatius* Ridley, *C. boshuensis* Kishinouye, *C. sulcatum* Kishinouye, *C. pusillum* Kishinouye, *C. inutile* Kishinouye, *C. confusum* Moroff, and *C. konojoi* Kishinouye. Two species, *C. johnsoni* (Gray) and *C. maderense* (Johnson), are found in Madeira. *C. stylasteroides* (Ridley) occurs in Mauritius, *C. regina* (Hickson) is found in Timor, and *C. secundum* (Dana) has been found at Banda, Ki Islands and in the Hawaiian Islands. This constitutes the entire list of established species of precious corals known to the present time.

The vertical distribution of these corals in the sea varies from 5 to 500 or more fathoms. They are found attached to rocks, dead shells, or dead coral; some species seem to prefer overhanging, submarine cliffs.

In general the vertical distribution of the Japanese species ranges from 50 to 180 meters, while in the Mediterranean fisheries the work of obtaining the coral is usually carried on in waters of much greater depth.

FISHING FOR PRECIOUS CORAL.

Fishing for precious coral is almost always carried on by means of various sorts of dredges. In Japan the dredge consists of a rectangular bag net about 1.5 meters wide and 1 meter high, with a 13 centimeters mesh, this is fastened to a frame of bamboo, tufts of old netting are fastened to the lower edge of the net and at the sides. These collect many broken coral branches. The coral fishing boats are allowed to drift over the banks with the sails at half mast. The net is allowed to touch the bottom and proceeds with a jerking motion. When the fishermen think they have secured or fastened to coral they pull up the net.

The dredge used in the Mediterranean coral fisheries is of wood in the shape of a large cross with a heavy stone attached to the extremity of the lower arm and with coarse, twine bags of large mesh and with numerous tangles of frayed ropes attached to the anterior arms. Numerous variations of this, as well as ordinary tangles, are also used.

USES AND VALUE OF PRECIOUS CORAL.

The chief use of precious coral is in the manufacture of coral beads and ornaments. It is first sorted into different grades, of which there are several recognized in commerce; it is then cut into suitable pieces and all necessary holes are drilled in it. It is then filed into any shape desired, and engraved. Next it is polished with pumice stone and water, followed by a polish of very fine chalk and water. Oil is never used on coral.

The value of precious coral depends upon its color, form, and quantity. A string of large uniform beads may be bought in Italy for 20 pesos, while a string of beads of similar size but of the best quality will cost 400 pesos. Japanese precious coral in its native state sells for from 100 to 500 pesos per kilogram, and the best Mediterranean sells for twice these amounts.

The export value of coral from Japan is about 500,000 pesos per year.

THE CULTURE OF CORAL.

The culture of precious corals has not received the careful scientific attention that it should.

C. nobilis has been kept alive for some time in aquaria, and if it were planted under natural conditions possibly it could be grown with profit. Careful experimenting along this line might lead to useful and valuable information.

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BLUE CORAL.

In numerous localities throughout the Philippine Archipelago a fine quantity of blue coral, *Heliopora cærulea* Linn., is found in considerable quantities, usually in water of from 2 to 10 fathoms depth.

This coral is a beautiful, permanent, cerulean blue in color. It takes a fine polish and is found in large heavy masses. No doubt it could be used in jewelry and ornamental work. No amount of polishing, however, will entirely obliterate the pores. I have collected this coral at Jolo, and at Butuan, Mindanao, on the eastern coast of Samar, and on the northern coast of Palawan. No use is made of it at the present time, but as a body for broaches, bracelets, etc., it would be very beautiful or as a background for pearls it would, in my judgment, be unsurpassed.

RED ORGAN-PIPE CORAL.

The red organ-pipe coral (*Tubipora* spp.) is very common throughout the Philippines. It has no especial value, its only use apparently being for cabinet specimens. It is a shallow-water form. I have seen large blocks of it used with other corals in the construction of a wharf.

REEF CORALS.

The common reef corals comprising a great variety of genera and species, which have as yet never been identified, are used largely in the building of roads throughout the Islands. They are employed to a limited extent in the manufacture of lime.

BLACK CORAL.

The so-called black coral (*Antipatharia* sp.) is very common in the Philippines. Fine specimens several meters in length and from 5 to 15 millimeters in diameter are common throughout the Jolo Archipelago. It is also found in larger quantities in the Gulf of Davao, Mindanao and near Cebu. It is usually secured in water of from 10 to 20 fathoms.

The U. S. S. *Albatross* dredged large quantities of this "insulated cable wire" as it was called by the sailors and this term, indeed, is fairly descriptive of the body of this coral; however, the branches are very numerous and give the small corals a decidedly shrub-like appearance.

¹³ This report includes a complete bibliography relating to corals.

This coral is used chiefly for making canes, as it is easily straightened or bent into any desired shape by immersion in hot water for a short time. It takes a most beautiful jet-black polish and could doubtless be used in the manufacture of coral beads and rosaries. A cane of this coral nicely prepared and polished can be bought for from 5 to 10 pesos. The raw material has very little value at present.